THE NAVAL ANNUAL

Edited by VISCOUNT HYTHE

1912

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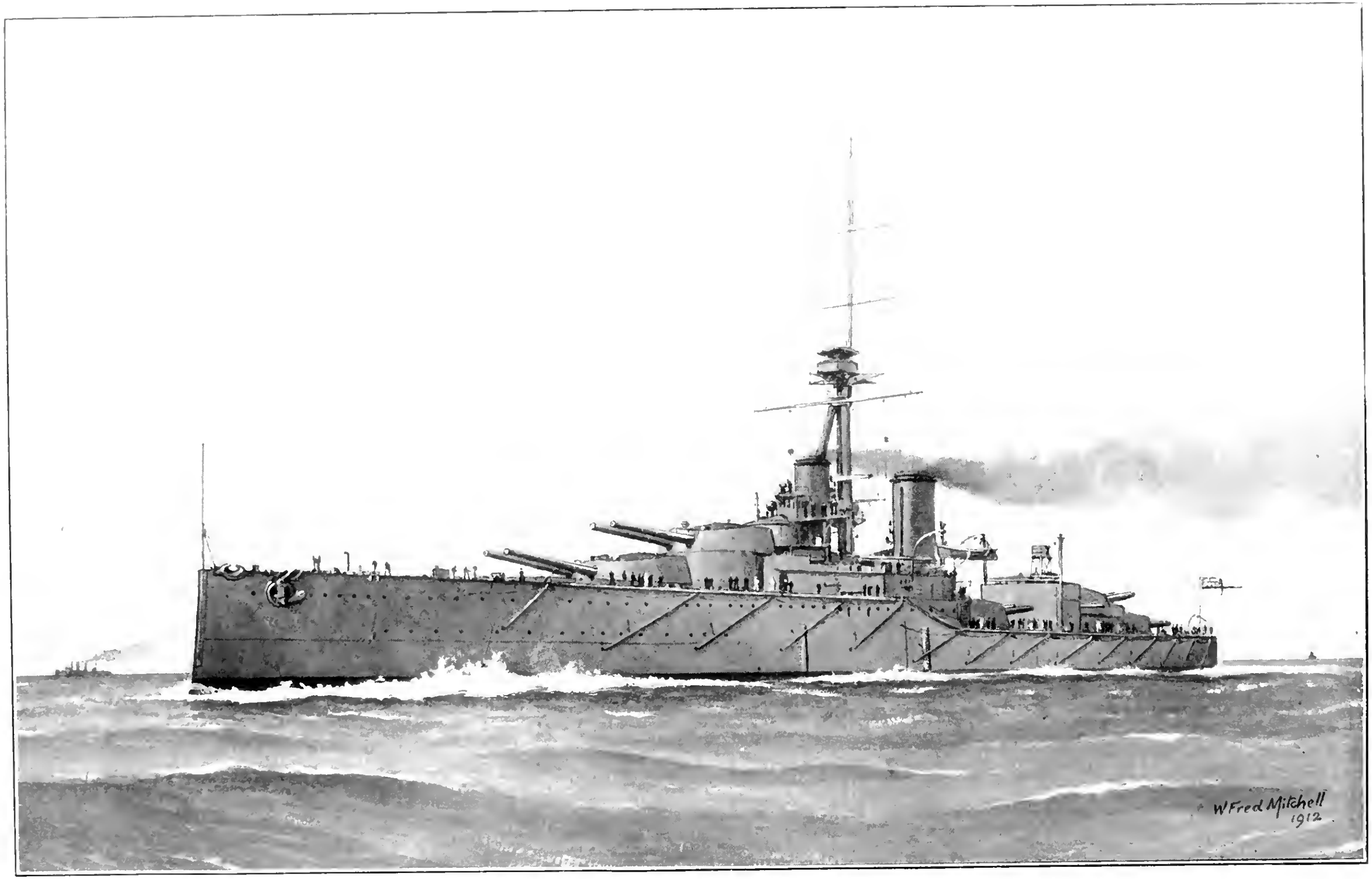

H.M.S. "MONARCH."

THE

NAVAL ANNUAL,

1912.

EDITED BY

VISCOUNT HYTHE, D.C.L., A.I.N.A.,
Honorary Fellow of Balliol; Commander of the Order of the Crown of Italy.

PART I.—EARL BRASSEY, G.C.B.; SIR WILLIAM H. WHITE, K.C.B.; Commander C. N. ROBINSON, R.N.; JOHN LEYLAND; ALEXANDER RICHARDSON; and the EDITOR.

PART II.—List of Ships: Commander C. N. ROBINSON, R.N., and JOHN LEYLAND.

Plans of Ships: S. W. BARNABY, M.I.N.A.

PART III.—Armour and Ordnance: Commander C. N. ROBINSON, R.N.

PART IV.—FIRST LORD'S MEMORANDUM, AND SPEECH ON INTRODUCTION OF NAVY ESTIMATES; BRITISH AND FOREIGN ESTIMATES.

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PREFACE.

WITH the growth of naval preparations in almost every country of the world, the work of preparing the *Naval Annual* for publication becomes heavier. The only important Power which has not increased her new construction during the year under review is the United States. Germany is adding to her naval programme; but even more noteworthy is the progress of the Navies of France and Russia. The fact that both countries have set their naval administration in better order, and are building up powerful fleets, will tend to preserve the balance of power in Europe.

The year has been one of unprecedented activity in British shipbuilding yards. A number of important ships are in hand for foreign navies. And it is interesting to note that our great private shipbuilding firms are extending the sphere of their activities. Messrs. Armstrong, Messrs. Vickers, and Messrs. John Brown & Co., are directly connected with the new construction now going forward in Spain and Russia, and the first-named firm with that about to be undertaken in Canada.

In his speech in the House of Commons on March 18th, the First Lord of the Admiralty described the steps that will be taken to maintain that command of the sea which is absolutely indispensable to our national existence, and set forth the only lines on which a reduction of expenditure on naval armaments can be brought about. The determination of the Government, as expressed by the First Lord, has been received with general approval. Hardly a dissentient voice has been raised. The fact that the people of this country appreciate the importance to them of the Navy, and the growing disposition of the Oversea Dominions to assist the Motherland in the defence of the Empire against aggression, are to a Britisher the most satisfactory features in the past year.

To one point of naval policy referred to in the following pages special attention may be directed. From time to time the arguments against the growth of dimensions have been set forth in the *Naval Annual.* These arguments apply with special force to-day as regards the latest type of battle-cruiser, which is some 10,000 tons larger and costs from £250,000 to £500,000 more than earlier vessels of the type. There is a noticeable growth of

opinion among naval constructors and others that the advantage of a knot or two in speed is much too dearly purchased. The weighty words with which Sir William White concludes his chapter, and the paper read by Admiral Sir Reginald Custance at the Spring meeting of the Institution of Naval Architects, merit the serious consideration of those responsible for the administration of the Navy.

Part I. of the present volume contains the usual reviews of the progress of Navies and comparative strength, which, for the reasons already given, involve far more work for the Editor than was the case a few years ago. Lord Brassey offers some suggestions on Naval Administration. Commander Robinson contributes an interesting account of the Italian naval operations, and Mr. Leyland's paper on Naval War Staffs gives an excellent survey of what is required for the British Navy. Mr. Richardson discusses machinery problems in high-powered warships. Sir William White, by special request, writes on a subject of which he is a master. Commander Robinson's work has been carried through in spite of serious illness. Mr. Barnaby remains responsible for the plates of ships.

Part IV., in addition to the usual matter, contains the First Lord's speech of March 18th, already referred to, and some papers regarding the Dominion Navies.

After twenty-one years' work, the Editor had serious thoughts of discontinuing the publication of the *Naval Annual*. The book was started by Lord Brassey, in the first instance for the benefit of Naval officers, and secondly to bring together reliable information in convenient form to awaken general interest in the Navy. With these objects in view it has been continued by the present Editor. The Admiralty now circulate to Naval officers far more information than they did some years ago. Other Annuals have come into existence. The *Navy League Annual*, from being a cheap publication which it was well for the Navy League to issue, has developed into a volume in the style of the *Naval Annual*, and to some extent competing with it. There might therefore seem to be less reason for carrying on the *Naval Annual* now than in days gone by. But after consultation with Naval officers and others whose opinion was of value the Editor came to the conclusion that the book was of real service to the Navy and the country, and that the time and trouble devoted to making the information given as reliable as possible were not thrown away.

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PART I.

CHAPTER I.

Suggestions on Naval Administration.

In submitting some suggestions on naval administration, the writer well knows how slender is the aid which outsiders can give to those in places of responsibility. Points in connection with the Auxiliary services may sometimes be overlooked. The present paper is largely compiled from the contributions of past years to the *Naval Annual*. To maintain supremacy at sea without adding unduly to the public charge has been the aim continually in view.

Reluctantly following naval developments elsewhere, the British Navy Estimates have been brought to a vast total :— Navy Estimates compared.

—	1909.		1911.	
	Total Expenditure.	New Construction.	Total Expenditure.	New Construction.
	£	£	£	£
Great Britain .	36,000,000	11,000,000	45,000,000	17,500,000
Germany . .	20,000,000	10,000,000	22,000,000	12,000,000
United States .	29,000,000	8,000,000	26,000,000	5,250,000

In the eleven years 1900 to 1910, the Navy Estimates have aggregated—for Great Britain, £383,000,000; Germany, £157,000,000; United States, £240,000,000. Our expenditure has grown in enormous proportions. Our supremacy should be beyond question. How do we stand? In men, in ships completed, in ships in commission, we hold a commanding position. In new construction, as measured by the amounts voted, we have not in recent years maintained the two-Power standard.

New Construction.

	Great Britain.	United States.	Germany.
	£	£	£
1909–10	11,074,550	7,976,897	10,177,000
1910–11	14,741,174	6,889,005	11,393,000
1911–12	17,567,000	5,343,789	11,710,000

It is not contended that progress has not been sufficiently rapid for present needs. We have to look to the future. If increased

construction should be required, it may be possible to put a check on expenditure for other services.

Manning.

This brings us to the policy in regard to manning. In numbers we far exceed the two-Power standard. Costs of manning must be high under a voluntary system.

Navy Pay, 1911–12.

		Numbers.	Wages. £
Great Britain		134,100	7,511,500
United States	1910	60,500	7,206,211
Germany	1910	57,355	1,910,010
France	1910	57,500	2,533,043

In addition to wages and victualling, expenditure must grow on the maintenance of ships kept in commission, largely for purposes of training. The cruisers of the larger classes at sea under the British flag vastly outnumber those under foreign flags.

The Admiralty insist on manning all effective ships with full crews of permanent men. In this they stand alone. No naval Power has ever yet maintained in peace the full numbers required in war. In the greatest period of our naval history the fleets were not manned by permanent men. The number of seamen in the British Navy was increased from 17,000 in 1792 to 120,000 in 1798; from 78,000 in 1802 to 140,000 in 1808. In the Crimean War the numbers were increased from 39,000 in 1852 to 76,000 in 1853. In the Civil War, the *personnel* of the Navy of the United States increased from 7000 men at the beginning to 58,000 men at the close. In the war with Spain, the numbers were doubled.

Highly trained men not necessary for all ratings.

Permanent men are required for gunnery, torpedo and signalling ratings, and for other services. Many duties may be efficiently performed, under supervision, by untrained men. When the ships of all nations were assembled at Spithead to do honour to his late lamented Majesty, on the occasion of his Coronation, the present writer paid a visit to the American flag-ship. Out of a total crew of 700 men, no less than 135 were drawn from the inland States, chiefly from Chicago and the vicinity. The captain of the ship spoke highly of these men. They had fully compensated for their inexperience as seamen by the pains they had taken to acquire a knowledge of their duties. In addition to the novices the complement included ninety-five apprentices. The ship's company was regarded by their officers as thoroughly efficient, although consisting, as to a full third of the total number, of

untrained men. In the fleets of all the Naval Powers, a considerable percentage of the crews are landsmen. In comparisons of strength, we do not reckon foreign ships to be inefficiently manned.

The continual increase in the demands for manning the Navy was viewed with apprehension by Lord George Hamilton, a Naval administrator of long experience. In his Memorandum on Navy Estimates for 1902, he described the steps which he proposed to take for the reinforcement of the Reserve:—"It seemed to be quite unreasonable to expect that the whole of the extra force, required to man our greatly increased Fleet, should exclusively consist of officers and men on the permanent establishments of the Navy, of continuous service, and entitled to pension. He was anxious to associate the increase of the permanent establishments with a steady growth in the numbers and efficiency of the Royal Naval Reserve." Lord George Hamilton.

In fixing the numbers of the permanent men, the probable wastage in naval warfare must be considered. This subject was discussed at the Colonial Conference of 1907. In his address on naval policy Lord Tweedmouth said:—"The question of manning was a very important one. The present view of the Admiralty undoubtedly was, after very careful consideration of the whole subject, that the conditions of modern war probably would lead rather to the loss of ships than of men. The results of the Japanese War, and other experience, had shown that there was always a considerable number of men saved, even if a ship be lost, and that the loss of men in battle was smaller in naval warfare than on land. As war went on we should find that we had a number of men at our disposal, whose ships had been either damaged or lost." Lord Tweedmouth.

On naval as on other questions, opinions, perhaps unconsciously, depend on the point of view. The Colonial Governments had offered assistance in the maintenance of the Imperial Navy by the enrolment of Naval Reserves. The Admiralty had desired to obtain financial aid. Hence, perhaps, the statement that reinforcements of the *personnel* were not urgently required. If the Naval Members of the present Board concur in the opinion of the Admiralty, as conveyed to the Colonial Conference in 1907, the necessity may seem less urgent than formerly for a continued increase in the numbers of our permanent men.

Whatever be the view as to the reliability of Reserves and as to wastage, the demands for the permanent force must be based on the number of effective ships which the Admiralty undertakes to man. If we place ships in reserve in the great ports of the outer Empire, the Colonial Governments may help in regard to manning. It is Numbers of men.

necessary to distribute as well as to concentrate our forces. I was serving at the Admiralty at the time of the Penjdeh incident. War with Russia was imminent. We were ill prepared. In the ports of Australasia, doing a Colonial and oversea trade, now reckoned in hundreds of millions, a panic prevailed, not altogether unwarranted, humiliating to the homeland, responsible for giving protection, and with no fast vessels in our squadrons. Two steamers of the P. and O. Company were hastily fitted out as cruisers at Hong Kong and Sydney. Heavy expenditure was incurred; no hastily improvised force can be really effective.

Let us take warning from the past. As we continue from year to year to build cruisers specially designed for naval operations in European waters, we should place in reserve in the ports of the outer Empire vessels which we can spare, and which may for many years be valuable for the protection of the coasting trade of Australia, if threatened by a stray raider. It would relieve the pressure on the Imperial resources if the complements could be filled up from the Naval Reserves of the Colonies. This subject will be resumed later in dealing with the scrapping of ships.

Commissions and Committees on Manning.

We have now to consider the steps to be taken for the reinforcement of the Reserves. The subject has been examined again and again by Royal Commissions and Departmental Committees, on which able statesmen have served. The continuous-service system, which has given to the Navy our force of permanent men, was introduced, in pursuance of the recommendations of a Committee of Naval Officers, appointed in the year 1852 by the Duke of Northumberland, then First Lord of the Admiralty. Our Royal Naval Reserve force, recruited from the Merchant Service and the fisheries, was created on the recommendations of a Royal Commission, appointed in 1859, to consider the manning of the Navy by methods more suitable than the press gang. In 1902 a Committee, of which Lord St. Helier was Chairman, inquired into "the increasing employment of lascars and foreigners in the Merchant Service, and the effect of such employment upon the reserves of seamen of British nationality available for naval purposes in peace and war." In 1903 the Admiralty appointed a Committee on the Naval Reserves. Sir Edward Grey was Chairman. The Navy was represented by Sir Edward Seymour, Admiral Henderson and Sir Hedworth Lambton; shipowners, by the late Sir Alfred Jones; the Treasury, by Sir Francis Mowatt; and the Board of Trade by Mr. Clarke Hall. The proposals set forth in the present Memorandum are largely based on the recommendations of Sir Edward Grey and his colleagues.

As a preliminary to the consideration of suggestions for the reinforcement of the Reserve, let us note the present strength. Reserve's present strength.

	Number voted 1902–03	Number voted 1911–12
Royal Naval Reserve	27,280	20,335
Royal Fleet Reserve	10,500	17,150
Pensioners	5,578	7,550
Colonial Reserves	—	1,550
Royal Naval Artillery Volunteers	—	4,400
Total Reserves	43,358	50,985

The first reserves for manning the Navy are the Coastguard and the Marines. The Coast-guard are seamen of long and meritorious service. They may be kept up to date by re-qualifying in the training establishments. When mobilised they give to the Service afloat the example of good discipline. They exemplify to the younger men the reward the Service has to offer to those who deserve. It is regrettable that the number of the Coast-guard has been reduced. Coast-guard.

In the Royal Marines we possess another reserve, which has never failed us. While the Seaman-class men have been continually increased, the Marines have been cut down. The recent policy seems unwise. The Marines are an amphibious force, specially adapted to our requirements—good soldiers on land; on board ship well disciplined and a working power, giving to the Navy some gunners of rare skill. Marines.

Passing from the forces permanently embodied, we turn to men trained in the Navy, and who have done service in the Fleet. By the creation of the Royal Fleet Reserve, men who leave the Navy without pensions, but with some years of training in the Fleet, are not, as formerly, lost to the country. The increase in the Royal Fleet Reserve has made good the reduction in numbers in the Royal Naval Reserve. Royal Fleet Reserve.

Turning to the means of recruiting from the Mercantile Marine and the civil population, trained stokers are the men whom the Navy chiefly needs. Sir Edward Grey's Committee was satisfied that the Merchant Service firemen would do good work in the stokehold and be amenable to discipline. The Navy Estimates for 1911–12 provide for a reserve of 5600 stokers. With a Mercantile Marine which gives employment in steam vessels to a quarter of a million of men, there should be no difficulty in increasing the numbers as required. Recruiting should be under the supervision of retired engineers, stationed at the chief mercantile ports. All the seventeen officers at present employed in the recruiting service are retired officers of Marines. Stokers.

The Navy requires firemen for service in tropical climates. The Committee on Reserves recommended that a Reserve of Lascars and Lascar stokers.

Kroomen should be enrolled. Large numbers are employed in the trade under the British flag with the East by the Suez Canal, passing through the hottest region of the globe. Lord St. Helier's Committee formed a most favourable impression of the lascars, belonging to the Northern races of India, who had come before them as witnesses. They did not feel competent to express any decided opinion on their employment in men-of-war. They had no doubt of their desire to be so employed, or of their competency, at least in the capacity of stokers and firemen.

Royal Naval Volunteers.

The Committee on Reserves reported that a body of volunteers would prove a most useful auxiliary branch of the *personnel* of the Navy in time of war:—"With only a slight knowledge of sea work, but with training in the use of naval arms, landsmen would be able on occasion to render most useful service." The first enrolments were made when Lord Goschen was first Lord of the Admiralty. The recruits of those early days were full of zeal and enthusiasm, not, perhaps, always associated with ready submission to authority. They insisted too much on being classed as executives and as seamen. They were disbanded, to the great regret of all concerned. On the advice of Lord Fisher the force has been reconstituted and organised in six divisions:

	Commander
London	The Hon. Rupert Guinness, C.B.
Clyde	Marquess of Graham, C.B.
Tyneside	Commander Lloyd, R.N., C.B.
Sussex	Viscount Curzon.
Bristol	The Hon. Cyril Ward, Lieut. R.N.
Mersey	Sir Richard Bulkeley, Bart.

The Admiralty provide an admirable staff of instructors. They have been liberal in appropriations for the construction of drill sheds. The force now numbers over 4000 efficients. On the Clyde and the Tyne the newly entered men are recruited largely from building yards, in which ships of the most powerful type are constructed for the Navy. It would be possible to raise volunteers in large numbers. After a short training they would be efficient for many duties, and especially as a reserve to the artificers of the Fleet. The Committee on Reserves recommended the enrolment of volunteers as a Reserve to the Marines, and to receive a similar training.

Colonial Naval Reserves.

The Colonies are well able to give Reserves for the manning of the Navy. At Colonial Conferences, Premiers and Ministers have enlarged with just pride on the quality and number of their maritime populations. In his address to the Colonial Conference of 1907, it was claimed by Sir Robert Bond, on behalf of Newfoundland, that

the fisheries of that Island gave employment to 60,000 hardy men. "For more than 400 years they had been a recruiting ground for the British Navy." Some 500 men have already been enrolled as a Reserve, and embarked in His Majesty's ships. The reports as to discipline, sailor-like qualities and efficiency have been most satisfactory. A Naval Reserve of 5000 men could be raised in Newfoundland. On the same occasion Mr. Brodeur pointed to the efforts which the Government of Canada had made to train Reserves for the Navy. They had been the first among the States of the Outer Empire to fit out sea-going ships for training. The seafaring people of Canada number not less than 70,000 men.

Australia has a considerable seafaring population. The number available as recruits for the Naval Reserves exceeds 30,000 men. Rear-Admiral Sir William Cresswell, first Naval Member of the Board of Naval Administration for the Commonwealth, has been an able and strenuous advocate for the creation of a local naval force. He has recommended the enrolment of a Reserve of 5000 men for service, not limited to the Australasian Squadron. He has developed schemes for enrolment and training, and shown the many services which the Australian Reserves could render to the Imperial Navy. All squadrons east of Suez and west of the Horn could be most rapidly and safely reinforced from Australia. The Australian Reserves might take the place of continuous-service men, who would be better utilised in the Battleship Squadrons. The Navy Estimates for 1911–12 provide for 550 Naval Reserve men in Australia, one-tenth of the number which Admiral Cresswell desired to enrol. It is a beginning.

Political considerations.

The enrolment of Colonial Reserves is commended by those political considerations on which the Committee on Reserves insisted. In their view a proportion of the company of every ship on a foreign station should consist of Colonial Reserve men. If this rule were observed, it would encourage the spirit of partnership in the Imperial Navy and distribute Reserve men evenly through the whole fleet.

If the recommendations respectfully submitted should be adopted, the total strength may be as under:—

Royal Fleet Reserve	30,000
Royal Naval Reserve	15,000
Royal Naval Volunteers	5,000
Stoker Reserve	5,000
Lascar Reserve	5,000
Colonial Reserve	10,000
Total	70,000

The Reserves as proposed for the British Navy do not exceed those of Continental Powers. With stronger and more fully trained Reserves there should be no present need for a larger force of permanent men.

Scrapping. We have now to consider the training of Colonial Reserves and, in this connection, the scrapping of ships. It should be the policy of the Admiralty to give all the aid they can to the Colonial Governments, in their patriotic endeavour to relieve the homeland of the heavy charge for their local defence. The Colonial naval forces will require gunnery ships and small cruisers for that training at sea which is essential to efficiency. Ships have been scrapped which would have been valuable in Australasia.

It has been a wise policy, largely due to the initiative of Lord Fisher, to put out of the dockyards vessels hopelessly inefficient for every service. The policy may be carried too far. At the Admiralty eyes are ever fixed on the latest ships of the most formidable foreign Power which we must be prepared to meet. We have to look at the naval position as it must be considered in Australia. And first let us take the battleships. Ships of the latest type are few in distant seas. Japan has two Dreadnoughts built, and three building. The other battleships of the Japanese Navy, eleven in number, are similar in armament, protection, and speed to the battleships we have lately sold at nominal prices. The list included ten ships completed as recently as 1894—two, the Nile and Trafalgar, completed in 1900—all of large dimensions, powerfully armed, of good speed, with ample coal and in sound condition. As the supply work of destruction goes forward, the fifteen older ships now on the list of effectives may shortly disappear. We have six ships Canopus type, date of launch 1897–9, cost £900,000; and nine Majestics, date 1894–6, cost £1,000,000. These ships carry four 12-in. and twelve 6-in. guns. Amidships and in the gun positions they are stoutly armoured. They are well adapted for service as gunnery ships. They would greatly strengthen the flotillas at present available in Australasian waters. The great ports of Australasia—Melbourne, Sydney, Brisbane, Adelaide, Perth, Wellington, Hobart—are situated at the head of deep inlets of the sea. The channels of approach are narrow and tortuous, between banks and shoals, in some parts too far from the land for effective defence by shore batteries.

When the present writer was serving as Governor of Victoria, Vice-Admiral Sir George Neville was in command of the Naval forces. The local Navy was a harbour-defence flotilla, consisting chiefly of torpedo vessels and gunboats. It included one small

coast-defence monitor, the Cerberus, launched in 1868. Such a vessel might have been put aside in Home waters as obsolete. Far away under the Southern Cross, a different appreciation may be formed as to the fighting efficiency of vessels. In a report addressed to the Minister of Defence Sir George Neville strongly urged that the Cerberus should be kept in a state of efficiency. His recommendations as to the Cerberus rested upon considerations which apply generally to Australian defence. The attack would be sudden. The Australian squadron would be concentrated, and possibly 2000 miles away. It was necessary to possess some means of defence by local forces afloat and ashore. The vessels making the attack would be unarmoured fast cruisers, unable to withstand the fire of heavy guns. Under cover of darkness it would be possible to force wide entrances defended by fixed forts. In the narrow inshore channels an armoured vessel would effectively bar the way. If the Cerberus could be recommended as effective for port defence, many vessels we have lately sold should have been deemed worth repair and maintenance for purposes of harbour defence, and as gunnery ships.

We have been hasty in the scrapping of cruisers. In the Minute on Admiralty policy presented to Parliament in 1905 it is contended that cruisers deficient in speed are at a hopeless disadvantage as scouts. Regard should be had to other services for which they might be required, and especially for the protection of trade in distant seas, beyond the range of the latest and most powerful cruisers of the enemy. In "the long wash of Australasian seas," in the brave west winds and southerly "busters" of the Southern Ocean, length and displacement are telling factors. In ability to keep the sea in the Southern Ocean, the cruisers of the earlier type are superior to vessels of higher speed but smaller dimensions, which the Government of the Commonwealth have been recommended to build. If the policy of late years is followed, the Diadem class, as the oldest on the list of protected vessels, may prematurely be consigned to the scrap heap. They deserve a better fate.

Passing from the armoured ships required for gunnery instruction and harbour defence, and the cruisers for the defence of commerce, we turn to ships of the smaller classes. Gunboats and third-class cruisers, such as those scrapped for no defect except their insufficiency of speed, would be excellent vessels for training purposes in Newfoundland, the Canadian ports, in South Africa and in Australasia. The utilisation of small cruisers for training of reserves was recommended in a Memorandum on Australian Defence by Captain Muirhead Collins, R.N., some time permanent head of the department dealing with defence in the colony of Victoria, and now filling

a high post in the office of the Australian Commonwealth. The practical recommendations may be quoted:—

"One thing is clear, namely, that the present system of local naval defence is entirely unsatisfactory. Everyone will agree that the Colonies should take some active share in naval defence. We have in Sydney a naval brigade formed largely of men who had previously served in the Royal Navy, with no ships to drill in. In Melbourne we have a naval brigade and only a harbour defence. In South Australia and Queensland there are naval brigades and a small class of vessel. What is wanted is the establishment of naval reserves, with adequate means of training and instruction in sea-going ships.

"There is no reason why ships in reserve should not be stationed at the several ports, and made use of for this purpose. It would be quite possible to drill a reserve effectively without, perhaps, the condition of a six-months' continuous service. With ships stationed at the different ports, the members of the reserve could be periodically embarked for cruises extending from a week to three weeks; and, not only that, they could put in other drills on board ship in harbour. Such a scheme might carry out the recommendations of the Conference, without having a permanent nucleus of these vessels in reserve raised by the Colonies. The permanent portion of the force might be Imperial."

The policy it has been sought to recommend would relieve the self-governing Dominions in no inconsiderable degree of the charge for building new ships. Admiral Henderson estimated the first cost of the ships proposed under his comprehensive scheme at £23,000,000, and the annual charges at £5,000,000.

At the Colonial Conference lately held, a Memorandum was presented by the Admiralty enumerating the vessels, of which the smallest Fleet unit should consist:—

1 armoured cruiser, Indomitable class, new,
3 unarmoured cruisers, Bristol class,
6 destroyers,
3 submarines.

For construction the estimate was taken at £3,700,000; for manning and upkeep the annual cost was put at £600,000. Let it be noted that Australia, alone of all the Dominions, has favourably considered shipbuilding proposals on an adequate scale. In addition to the charge for the Navy, the cost of the new defence scheme, adopted on Lord Kitchener's recommendation, is estimated, in the initial stage, at £1,130,000 annually, to be increased in a few years

to £2,000,000. The total appropriations of the Australian Commonwealth to defences were estimated for 1910–11 at £2,713,424.

Expenditure from Colonial exchequers on the greatly increased scale lately recommended must be spread over a long space of time. In the interval which will elapse before all the ships proposed for the local navies are completed, we may, at little cost to our homeland, confer a real boon on our kin beyond the sea. We may, as it has been said, place vessels in reserve in Australasia, which would materially increase the means of defence, at least from such forms of attack as it is necessary to prepare to meet. In doing this essential work of co-operation we create a new bond of Empire.

Boy seamen.

Having dealt with the reserves, the training of merchant seamen may be briefly considered. The Navy should never lose touch with our Merchant Navy, the mainstay of our strength, the pride and glory of the country. The qualities of the British seaman have been eloquently described by Lieutenant Miller in command of the school-ship Conway: "While none of the races which follow the sea—lascars, negroes, Frenchmen, Danes and Swedes—are wanting in good qualities, the Briton will do more hard work of any kind and do it better: he will be less dismayed in time of danger; he will struggle on longer and die harder at the last, faithful to the end. All the best qualities of the grand race to which he belongs are to be found in him." Let us not practise paltry economy in the provision for the training of seamen.

Every Commission and Committee of Inquiry has recommended that State aid should be given for training. The Manning Commission of 1860, to which reference has already been made, in their Report, drawn, as it is supposed, mainly by Lord Cardwell, recommended that twelve school-ships should be established at the principal ports. In each ship one hundred boys were to be in training at the expense of the State. The annual cost was estimated at £40,000. Descending to our own times, in 1906 a Committee was appointed to inquire into the supply and training of boy seamen. Lord Devonport was the chairman. Shipowners were ably represented by Sir Alfred Jones, Sir Walter Runciman, Mr. Charles Wilson, and Mr. Stephen Furness. The Committee recommended State aid under prescribed conditions. "Seeing," they said, "how closely the interests of this country are connected with those of the shipping industry, it is needless to insist on the importance of proper provision being made for the training of sailors for the Merchant Service. We are of opinion that there is ample justification for State assistance. It should take the form of a capitation grant to approved training institutions." The Committee recommended a grant of £20 in respect of each boy

trained for the sea service, the number of boys in training not to exceed 5000.

At the Conference lately held in London under the auspices of the Navy League, Mr. Geoffrey Drage in the chair, the managers of every training ship maintained by private benevolence were present. They spoke with one voice. They declared it impossible to raise the necessary funds for the effective training of boys in adequate numbers. The Exmouth, the finest training ship in the world, is maintained by the funds supplied by the Metropolitan Asylums Board. The standard of efficiency attained could not have been reached unless the means had been provided from sources less precarious than voluntary subscription.

State aid should not be limited to harbour ships. Shipowners should be encouraged to take apprentices for training at sea. The testimony is unanimous that the training is best given in sailing ships. The advantages were commended to the Committee on the Training of Boy Seamen by the owners of the Allan Line steamers in an interesting Memorandum. "Sailing ships," they say, "have been the recognised training school. The length of their voyages at sea, compared with those of steamers, and the character of the work on board, give greater opportunity for the instruction of the sailor. Observation is sharpened; energy, endurance and resource in times of emergency are all stimulated and strengthened." The cost of training is about the same in sailing ships as in harbour ships. On a late occasion the Marine Society sent 200 boys to sea in the sailing ship Illawarra, on a round voyage to and from Australia. The cost was £25 per boy, or approximately the amount taken in all estimates of the cost of training by Commissions and Committees, and considerably below the charge in the training establishments for the Royal Navy. We must look to the Board of Trade to take the initiative in the training of boy seamen. The cost of subsidies should fall on the votes for education. The amount would be small in relation to the total expenditure. The Admiralty should be ready to give help in supervision and in the supply of competent instructors.

Officers R.N.R.

State aid in the national work of training for the sea should not be limited to seaman-class men. There is need in the Reserves for highly trained officers. Two officers' school-ships have for many years been established—the Worcester in the Thames, and the Conway in the Mersey. The education in these ships leaves nothing to be desired. The training in the school-ships is not followed up. There is no organised system for the education at sea of young officers of the Mercantile Marine. The writer made a successful experiment in sailing ships under the management of Messrs.

Devitt and Moore. To make adequate provision for the sea training of the officers of the Naval Reserves is far beyond the scope of private effort. At great cost to the State, the cadets reared in the Navy receive a liberal education and complete professional training. The Admiralty should make some provision for the education of cadets of the Naval Reserve.

In closing these recommendations, the Report of the Royal Commission on Manning may appropriately be quoted:—"We possess," they said, "in the Mercantile Marine elements of naval strength such as no other country in the world enjoys. It is in the power of the Government to draw closer to the State, at the moment of danger, the loyal enthusiasm of those on whom your Majesty must rely. While the primary object of any scheme of training at the public charge is protection from the hazards of war, it is an advantage not lightly to be valued that the enrolment, training, and maintenance of a Reserve must improve the position and elevate the character of British seamen of both the Services, and knit them together in the firm bonds of reciprocal feeling and of common interests."

Training boy seamen for Navy.

In this connection some observations may perhaps be made as to the training of boy seamen for the Navy. The present system is perfect in the beginning in the shore establishments; it leaves something to be desired in the more important stage when the boys are first sent to sea. The instruction must materially differ from that of former days. In some essential features it must remain as before. Sea conditions are unchangeable

> . . . in all time,
> Calm or convulsed—in breeze, or gale, or storm;
> Icing the Pole, or in the torrid clime,
> Dark-heaving . . .

In whatever type of ship they serve, qualities are needed in the crews which can only be acquired at sea. Training-ships making rapid passages under steam cannot be the best school. For purposes of training the total disappearance of masted vessels is regrettable. I have before me an interesting letter from Sir Beauchamp Seymour, dated from the Helicon, Bocche di Cattaro, November 9, 1880. He deals with the difficulty at that time experienced in "finding vessels as training-ships for ordinaries." History repeats itself. It is reported that the like difficulty is found to-day in sending boys to sea from the training establishments on shore. The numbers are large and increasing. Estimates, 1911–12: Boys (service), 2161; boys (training, seamen class), 1911–12, 4340; 1910–11, 3295; boys training (artificer and artisan), 6220; total boys, 7121. For the first training of boys

at sea the mastless battleships, as it has been said, are not the ideal type. Sir Beauchamp Seymour proposed to build special masted vessels of moderate displacement and fitted with auxiliary engines. He would not attempt to arm ships specially designed for training boys in seamanship; the ports would be fitted for ventilation and not for guns. His recommendations as to the cruising-ground might with advantage be followed in the present day when the Battle Fleets are concentrated in Home waters. "When," he said, "you have got your training-ships, the question remains—where to send them. England is no place for the young fellows; the bad weather you have in the Channel knocks the heart out of them, and wherever you go there is leave or grumbling. I would have the Mediterranean the cruising-ground, and send the drafts of boys out there as they leave the harbour training-ships. There is plenty of bad weather here, too, but it is not the wretched, wretched work of the Channel or the Bay in an easterly gale in February. I would let the ships visit all the seaports on either side of the Mediterranean; I believe that a service of this sort would be popular." After many years as a yachtsman in the Mediterranean, the present writer would commend the south coast of the Peninsula, between Lagos Bay and Carthagena, as an ideal cruising-ground in the winter months. From whatever quarter the wind may blow, it is always possible to take shelter under the land. With a training squadron based on Gibraltar, the problem of dealing with boys on first going to sea would be solved in the best way and at the least cost. The physical training aloft and on deck would tend to higher efficiency in all the ratings in the Navy.

Auxiliary cruisers.

From reserves of men to reserves of ships. In opposing the ratification of the Declaration of London, Chambers of Commerce have complained chiefly of the danger to trade from the conversion of merchant steamers into cruisers on the high seas. Having failed, as might have been expected, to induce the military powers, who have no naval stations in distant waters, to give up the right they claim to convert merchant ships into cruisers on the high sea, let us not neglect the means of defence which we have at command in the Mercantile Marine, by the conversion of our many fast vessels under the British flag into auxiliary cruisers.

The naval advisers and administrators of the United States were among the first to appreciate the importance of auxiliary cruisers. In a Report of 1869 the Secretary of the United States Navy wrote as follows: "There is another element of defence in time of danger, perhaps as effective as any other available to wise and liberal statesmanship, and such means would be at hand if we had lines of ocean-going steamers of high speed and able to keep the sea for any

length of time. Any of the ships could be converted quickly into a ship of war. A comparatively small force of this kind, appropriately armed, and let loose on the ocean, under the command of bold and intelligent officers, would be a dangerous foe to the commerce of any country. Our own ships were substantially driven from the seas by two or three roughly equipped vessels much inferior in power to those of which I have spoken."

Subventions to mercantile cruisers were strongly advocated by Sir Nathaniel Barnaby when Chief Constructor to the Navy. In a paper read at the Institute of Naval Architects in 1878, he proposed that the fastest steamships in the Merchant Service should be placed on an Admiralty list. They should be specially adapted for service as cruisers, by internal sub-divisions, more complete than would be required in ships built solely for purposes of commerce. Armaments and fittings were to be prepared and kept in store at naval stations, as well as at Home ports. The crews would be completed from Home and Colonial Reserves. In the discussion on Sir Nathaniel Barnaby's paper, Admiral Sir Frederick Grey gave the lessons of his long experience: "The idea of trusting to our merchant ships at all has been deprecated. Now, having been at the Admiralty, and felt the difficulty of providing even in peace time the force necessary to fulfil the various duties devolving on our ships of war, I think it would be utterly impossible for the Navy alone to provide sufficient protection for our merchant ships." At a later date similar proposals were approved by Sir Cooper Key and Sir Anthony Hoskins.

The policy advocated in former days by the naval authorities was supported by leading shipowners. An able paper was contributed to the *Nautical Magazine* by the late Lord Inverclyde: "There never was a time in the history of this country when the subject of the efficiency of the Royal Navy occupied a position of greater importance than it does at present. Our risks lie in the fact that the fleets of other nations are fast becoming powerful and reliable; and whilst no Navy can numerically approach that of this country, yet there are nations in Europe whose fleets combined would undoubtedly give us enough to cope with. How then can we stride ahead as the greatest maritime Power and hold our own against the fleets of the world? Not by being satisfied with increasing the strength of the Navy proper, which, owing to the prodigious cost of modern vessels, can only be done in a comparatively small degree. But what cannot be accomplished in that direction can be attained by other means ready to our hand, and that is by utilising the vessels of the Mercantile Marine."

The Admiralty has not been negligent of its duty in pushing the

construction of cruisers. The number can never be sufficient to give full protection to trade in every sea. Behind the regularly built cruisers, in distant waters, south of the line, and in the far East, auxiliary cruisers may do good service. The cost to the State would be inconsiderable as compared with the building of regular cruisers. It is not necessary to insist on extreme speed. The merchant steamers which might be converted into cruisers would not be the greyhounds of the North Atlantic. The mercantile cruiser will be vulnerable. So, too, the regular cruisers lately built for the Navy, designed chiefly for fast steaming, not sufficient in displacement to carry armour. If service as cruisers were considered in the original construction the large merchant steamer may be protected by internal sub-division and an armoured deck, and fitted to carry a light armament.

The Mercantile Marine can supply a valuable reinforcement to the Navy in the narrow seas in vessels for service as scouts and sea-keeping destroyers. We have in the cross-channel services thirty-nine vessels steaming twenty knots and over. All these vessels could carry a torpedo armament. They can keep the sea in all weathers.

Showing the Flag.

Taking advantage of the present opportunity, it may once more be urged that the policy as to "showing the Flag" shadowed forth in the statement laid before Parliament by the Admiralty, in 1905, should continue to engage attention. It was claimed that so imposing and ubiquitous a display of power had never before been attained by our Navy. Our fellow-subjects in Australasia have seen little in late years to reassure them as to the power of the Imperial Navy.

The Flag of the United States was displayed with impressive effect on the unprecedented occasion of the voyage of circumnavigation, undertaken with signal success by the armoured fleet. There has been no similar demonstration under the British flag. It should be made. Two of our latest Dreadnought cruisers, imposing specimens as they are of naval architecture, with the four cruisers of the Good Hope class, would form a noble squadron. In the great harbours of Australasia they would be welcomed enthusiastically and leave a lasting impression.

Relations with Germany.

Finally, the writer takes occasion to refer to matters which must, in the present posture of affairs, cause deep concern to all thinking men, and which in an eminent degree affect the Admiralty. If the hostile feeling which unhappily exists in Germany (not without some provocation) continues, we must look for renewed efforts in construction.

Let us consider the circumstances which have led to mutual

distrust. In Germany the construction of battleships has advanced on a scale unapproached elsewhere. It has caused anxiety—perhaps undue anxiety—in this country. Germany does not stand alone in the resolve to create a strong Navy, Leading statesmen in all countries have been impressed by the writings of Captain Mahan. In the United States, of all countries the most secure from foreign foes, President Roosevelt had ambitious schemes of naval expansion. Everywhere the belief is held that a nation has no influence without a Navy. Nor is this conviction new. Naval weakness in former times was a moving cause of the discontent then universal in Germany. In a memoir on the political condition, written in 1847, Prince Hohenlohe, Minister at Athens, used these words: "No one will deny that it is hard on a thinking energetic man to be unable to say abroad, 'I am a German,' and not to be able to pride himself that the German flag is flying from his vessel. And when we study the map and see how the Baltic, the North Sea, and the Mediterranean break upon our shores, and how no German flag commands the customary salute . . . surely the hue of shame will rise into our cheeks."

To create a Navy was impossible while Germany was a divided land. It was sure to be undertaken when Imperial unity was achieved. Russia and France were in close alliance and strong at sea. To redress the balance was a not unnatural resolve. Many ships were built of a type adapted to shallow waters. They became obsolescent at a stroke by the creation, under the direction of Lord Fisher, of a new type with unmatched superiority in speed, and armed with guns of longer range than any hitherto carried on board ship. There was no reticence in the commendation to the public of the new design. It was proclaimed that all earlier ships were obsolete. Lord Fisher carried consternation into Boards of Admiralty.

Nutuit et nutu totum tremefecit Olympum.

In Germany it was resolved to make a vigorous effort to build Dreadnoughts. The total number proposed under the Navy Law was thirty-eight. Four ships were to be laid down annually, to be reduced to two ships in 1912. We might have wished that the construction had been spread over a longer term. The aggregate force proposed cannot be pronounced excessive for the Fleet of a first-class Power.

If no clouds had arisen in Morocco, we might shortly have found ourselves under serener skies. It should have been possible to fulfil our obligations to France without giving offence to Germany. To indicate how reconciliation might be effected would take us too far into politics. The cession of Walfisch Bay might fittingly be

considered on a suitable opportunity. To hoist our flag on the only good harbour on the coast of German South-West Africa was an example of some characteristic British propensities which we find it difficult to hold in check, and which do not win for us universal good will.

There may be objection in South Africa to the cession of Walfisch Bay. With a magnanimity beyond example, we have given to that country unrestricted powers of self-government. In return, we may ask that British interests should be considered. While we retain the naval supremacy no harbour on those distant coasts can be used as a base for operations directed against South Africa. Objections would be removed if compensation could be found elsewhere. Nor should it be impossible by friendly negotiation to obtain for South Africa full powers of administration in Delagoa Bay, under the flag of Portugal, and under an imperial engagement for the payment of an annual sum equal to the present net revenue. We have a precedent in our occupation of Cyprus under Turkish suzerainty. In our dealings with Germany generally let us take a new departure. In commerce the rivalry is keen but friendly. It is the desire of the masses in both countries to be friends. The cordial invitation lately addressed by the Mayor of Berlin to the Lord Mayor, and gladly accepted, is an incident of happy augury.

And now a self-imposed labour is ended. It is well to turn over from the active service of other days to a harbour ship under the old flag.

BRASSEY.

CHAPTER II.

THE BRITISH NAVY.

THE appointment, in November, of Mr. Winston Churchill to be First Lord of the Admiralty, in the place of Mr. McKenna, led to an almost complete change in the *personnel* of the Board. Admiral Sir Francis Bridgeman has become First Sea Lord in place of Admiral of the Fleet Sir Arthur Wilson, whose time was not up till March, 1912. Both these distinguished officers rank with Sir Geoffrey Hornby and Sir Michael Culme-Seymour as the most capable admirals of their day in handling fleets at sea. From this point of view it is regrettable that Sir Francis Bridgeman should have been withdrawn from his sea command. Sir Arthur Wilson has done invaluable service to the country as First Sea Lord at a critical period in the history of the Navy, and no one can appreciate better than naval officers themselves how well he has maintained the best spirit of naval administration. His successor may be confidently relied upon to follow in his footsteps. H.S.H. Prince Louis of Battenberg has succeeded Sir George Egerton as Second Sea Lord, and Captain W. C Pakenham follows Rear-Admiral Madden as Third Sea Lord. Rear-Admiral Briggs remains Controller of the Navy. Sir Francis Hopwood has been added to the Board as an Additional Civil Lord, with a fixed tenure of office. The First Lord explained his duties as follows:—"He will conduct the business and commercial transactions of the Board, and all their relations with the great contracting firms. It will be his duty to furnish the Third and Fourth Sea Lords with all that they may require in order to build, arm, equip, and supply the Fleet." The transfer of Vice-Admiral Sir George Callaghan from the Command of the Second Division to be Commander-in-Chief of the Home Fleet (a post which has included the Command of the First Division), has entailed a redistribution of other commands. Board of Admiralty.

The creation of the Naval War Staff was one of the first steps taken by the new First Lord. The subject, which has been for some time under consideration, is discussed at length in a later chapter, and the First Lord's Memorandum is printed in Part IV. Whether as important results will follow from the step as some of its advocates predict, the principles on which the War Staff has been established are sound, and have been generally approved. Naval War Staff.

It is satisfactory to know that the functions of the War Staff at the Admiralty are advisory and that it will possess no executive authority and discharge no administrative duties. With the First Sea Lord rests the decision as to accepting or rejecting its advice. His responsibility will therefore not be impaired—a very important point. As regards the War Staff for the Fleet, it is stated in the First Lord's Memorandum that for Officers appointed to the Staff there will be regular periods of sea-going executive duty alternating with periods of employment on Staff duties. In an explanatory Statement, issued by the Admiralty in March, this point is still further insisted upon. Officers appointed to the Staff have no claim to be continuously employed on Staff duties. The creation of a special class of Staff Officer is certainly not desirable in the Navy. The Officer who is frequently serving as an executive Officer will be better fitted for Staff duties than one who has lost touch with the ordinary work of the Naval Officer afloat.

Warship construction in Great Britain.

One of the most remarkable features of the year under review is the activity in the war shipbuilding industry of Great Britain. Seven large battleships and five battle-cruisers (including the Australia and New Zealand) have been under construction throughout the year for the British Navy, in addition to the four battleships and one battle-cruiser laid down or ordered towards the end of the year. Thanks to the enterprise and efficiency of organisation of our great private firms, this country is directly or indirectly responsible for a large proportion of the warship construction now in hand for the world's navies. Messrs. Armstrong, Whitworth & Co., Messrs. Vickers, Messrs. John Brown & Co., Messrs. Beardmore, and others have spared no expense to bring their plant for the construction of hulls and machinery, armour and ordnance up to a high state of efficiency, and they have been assisted by the wise distribution of the orders of our own Government. They are now reaping the reward of their enterprise, and most of our principal private yards are full of work. There are under construction, at British yards, battleships for the Brazilian, Chilian, and Turkish Navies, a battle-cruiser for Japan, three monitors for Brazil, besides scout-cruisers for China and torpedo craft for various Powers. British firms are also responsible for the carrying out of the large shipbuilding programme now in hand in Russia, both in the Baltic and Black Sea, and are directly interested in the combination which is building the Spanish battleships at Ferrol and gunboats at Carthagena. Including ships building abroad, about fifty per cent. of the armoured ship construction of the world is at the present moment in British hands. A recent visit to some of the leading shipbuilding yards on the Tyne

and the Clyde shows that our present position is likely to be maintained. Messrs. Armstrong are preparing an entirely new shipyard some miles down the Tyne from their present yard—the increased size of modern warships having much reduced the number of slips available at Elswick, while the width between the piers of the low-level swing-bridge at Newcastle makes it difficult to pass the later broad ships. The magnificent new shipyard and engineering shops of Messrs. Beardmore at Dalmuir, on the Clyde, are capable of coping with more work than they have at present in hand, while Mr. Meyer, the Secretary of the United States Navy, speaks in the very highest terms of the system of administration and organisation of the enormous business controlled by Messrs. Vickers.

We have reason to be proud of our great private establishments for the production of war material—a very important element in naval strength—but the good work done in the Royal Dockyards must not be forgotten. Of the latter Mr. Meyer, an impartial witness, speaks as follows:—

"In the English dockyards I noticed particularly a cordial spirit of co-operation among the different departments. There seemed to be no jealousies and nothing but the best team-work. Paper-work and red tape had been reduced to a minimum, and this was also the case at the Admiralty; in fact, throughout the British Navy."

In the year 1910–11 only one battleship, the Neptune, and one battle-cruiser were added to the Navy. During the year under review four battleships have been completed. The battle-cruiser Lion will not be completed till May. The Colossus and Hercules belong to the 1909–10 programme, and were launched respectively on April 9th and May 10th, 1910. Both went through their trials in March, 1911, and were practically completed when the last volume of the *Naval Annual* was published. They are attached to the Second Division of the Home Fleet. Displacement, 20,000 tons; speed on trial, 21·5 knots. The main armament consists of ten 12-in. guns, mounted as in the Neptune, and not as in the earlier ships of the Dreadnought type. In the Dreadnought, Bellerophon, Temeraire, Superb, St. Vincent, Collingwood, and Vanguard, the turrets are placed abreast on each forequarter, and the centre turret is on the same level as the after turret. Consequently these ships have eight guns available on the broadside and six for firing ahead or astern. In the Neptune, Hercules and Colossus, two turrets are echeloned amidships, and there are two turrets abaft the superstructure, one firing over the other. In this case ten guns instead of eight are available on the broadside, six, as in the Dreadnought class, for firing ahead and eight for firing astern.

1909-10 programme.

Colossus.

Orion. class.

The Orion is the third of the eight armoured ships of the 1909–10 programme to be completed and the first to mount the new 13·5-in. gun. Displacement, 22,500 tons. Some particulars of these ships were given last year. The main armament consists of ten 13·5-in. guns, which throw a projectile of 1250 lb. as compared with one of 850 lb. for the 12-in. gun. The 13·5-in. gun itself weighs only about ten tons more than the 12-in gun. Both guns are of the same length, the former being of 45 calibres and the latter of 50 calibres. All the turrets in the Orion class are, for the first time in British battleships, placed on the centre line, the second and fourth turrets being raised so that the guns in them can respectively fire over the bow and stern turrets. This gives a broadside fire from ten guns, but only four can be fired ahead or astern. The anti-torpedo armament consists of sixteen 4-in. guns mounted on the upper deck and on the superstructures. The Orion is protected by a belt at the water-line 12 in. thick amidships, extending for about 60 per cent. of the length and tapering to 4 in. at the ends. The side above the belt is protected by 9-in. armour up to the main deck, and by 8-in. armour between the main and upper decks. The predecessors of the Orion have no protection on the side above the main deck. The turbine machinery is by the Wallsend Company. There are four shafts each with an ahead and astern turbine. There are two high-pressure and two low-pressure turbines for steaming ahead and the same for steaming astern. The boilers are of the Babcock and Wilcox type.

The official steam trials of the Orion took place on September 11th and 18th, and passed off satisfactorily. The following results of her trials and those of two of her sister ships are taken from *Engineering*:—

—	30 Hours' Trial			8 Hours at Full Power.		
	S.H.P.	Coal.	Speed.	S.H.P.	Coal.	Speed.
		lb.			lb.	
Orion . . .	18,966	1·8	19·5*	29,108	1·6	21·02*
Monarch . .	19,128	1·8	—	28,555	1·9	21·88*
Thunderer . .	18,927	—	18·8*	27,416	1·78	20·8*

* Mean speed of measured distance runs.

The gunnery trials were equally satisfactory. All the ten 13·5-in. guns trained on the broadside were tried simultaneously. The ship heeled over about 3 degrees, but no damage was done to the hull and

the mountings of the guns are reported to have shown no signs of weakness.

Monarch.

The Monarch, of the same class as the Orion, was laid down at Elswick on April 1st, 1910, and launched on March 30th, 1911, with a weight of 11,500 tons on board, including 2000 tons of armour, with all her boilers in place, decks rivetted down, funnels and bridges in position—this notwithstanding the fact that all work had been stopped for sixteen weeks owing to the shipyard lock-out—and went through her trials at Devonport in December. She will be handed over on March 31st, and will thus have been completed in less than two years, in spite of the shipyard lock-out, thanks to the energy of the contractors. The whole of the movable parts of the five barbettes, with all internal fittings and armour, ten 13·5-in. guns, and the barbette crowns were placed on board in five days. After the completion of her steam and gunnery trials the Monarch returned to the Tyne to be fitted out for commissioning. She is the first of the four contingent ships of the 1909–10 programme to be completed.

Thunderer and Conqueror.

The Thunderer was launched from the Thames Iron Works on February 1st, 1911, and the Conqueror, the fourth ship of the Orion class, from the yard of Wm. Beardmore & Co., Dalmuir, on May 1st. At the launch of the latter, Mr. Beardmore stated that the ship would have been in the water four months earlier but for the shipyard lock-out. That, in spite of this, such good progress has been made with the construction of the ships in hand is very creditable to the various contractors. The Thunderer went through her trials early in March, and will be completed in May. The Conqueror will be completed in August.

Battle-cruiser Lion.

The battle-cruiser Lion, which was launched on August 6th, 1910, at Devonport, went through her trials in January, 1912. Displacement, 26,350 tons; designed speed, 28 knots, with 70,000 S.H.P. The armament comprises eight 13·5-in. guns, which give a broadside fire of 10,000 lb., as compared with 6800 lb. for the battleships which can use only eight 12-in. guns on the broadside. A full description of the machinery and boilers, which were constructed by Messrs. Vickers, appeared in *Engineering* of January 5th, from which the following extracts are quoted:—

There are two sets of turbines, entirely independent of each other, and arranged on either side of the centre line of the ship. There are four shafts, each with one propeller. Each set comprises a high-pressure ahead turbine, in which is incorporated a cruising stage at the forward end of the turbine for working at low power only, the steam being by-passed over this stage at full power or at high fractions thereof; a low-pressure ahead turbine; a high-pressure astern turbine; and a low-pressure astern turbine. The high-pressure ahead and astern turbines are separate, and both are mounted on a wing shaft, while the low-pressure ahead and astern turbines are within one casing and are on an inner shaft. All of the turbines are of the Parsons re-action type, and the machines in each set work in series. All four

shafts are available for ahead and astern working. . . . There are forty-two water-tube boilers of the Yarrow type, working at 235 lb. pressure per sq. in., and arranged for forced draught with closed stokeholds. The boilers are fitted in several water-tight compartments, with more than usual sub-division.

The trials of the Lion took place in very heavy weather. No precise details have been published, but it is reported that, though the contract S.H.P. was exceeded by 10 per cent., the speed expected was not obtained. Other propellers have been tried. The great heat from the funnels during the trial at full power caused the metal fittings of the bridge, etc., to melt, and made it impossible for anyone to continue on the tripod mast. The mast is to be removed, the position of the funnel is to be altered and other modifications carried out, at a cost of £25,000, which will delay the completion of the ship until May.

Princess Royal.

The battle-cruiser Princess Royal, which is practically a sister ship to the Lion, was launched at Barrow on April 29th, 1911. Displacement, 26,350 tons; length over all, 700 ft., and between perpendiculars, 660 ft.; beam, 88½ ft.; draught, 28 ft. Contract speed, 28 knots, with 70,000 S.H.P. The Princess Royal is protected by a belt extending nearly the whole length of the ship, of a maximum thickness of 9 in., tapering to 4 in. at the ends. The side above the belt is protected by 6-in. armour, while the armour on the gun-houses is 9 in. thick. There are two protective decks. The armour of the Princess Royal, and of the later armoured ships now under construction, has 25 per cent. more resisting power than that of previous ships, due to a process invented by English makers. Similar modifications to those in progress in the Lion are to be made both in the Princess Royal and Queen Mary.

1910–11 programme. Battleships.

Of the four battleships of the 1910–11 programme, the King George V., which was laid down at Portsmouth on January 16th, 1911, was launched on October 9th of the same year. The Centurion, which was laid down at Devonport on the same date as King George V., was launched November 18th, 1911. The Ajax was launched at Messrs. Scott's yard, Greenock, on March 21st, 1912, and will be completed by March 31st, 1913. The Audacious is likely to be launched at Messrs. Cammell Laird's works, at Birkenhead, in the early summer, and is not due for completion till 1913–14. The following are the leading particulars of these ships:—

Length between perpendiculars . . .	555 feet.
Beam	89 feet.
Displacement	23,000 tons.
S.H.P.	27,000.
Speed	21 knots.

Main armament, as in the Orion class, ten 13·5-in. guns.

These ships may have a secondary battery of 6-in. guns mounted in gun-houses, a very considerable improvement on their predecessors. The 4-in. so-called anti-torpedo boat armament of recent British battleships and battle-cruisers is mounted in the most exposed positions, so would be useless after an action, and in any case is hardly powerful enough to stop a modern destroyer of 750–1000 tons displacement. Recent German battleships are provided with a powerful secondary battery of 6·7-in. or 5·9-in. guns. The area and thickness of the protection are similar to that of the Orion class.

Battle-cruiser Queen Mary.

The battle-cruiser Queen Mary, which was laid down at Messrs. Palmer's yard, Jarrow, on March 6th, 1911, was launched on March 20th, 1912. This vessel is to be fitted with Parsons turbines and Yarrow boilers, supplied by Messrs. John Brown & Co. The displacement is reported to be 27,000 tons, the length being the same as the Lion, but the beam is greater. The armament and protection do not differ materially. The estimated speed is 28 knots, with 75,000 S.H.P.

The battle-cruiser New Zealand, presented by the Dominion to the British Navy, was launched at Fairfield on July 1st, 1911, but progress has since been delayed by the non-delivery of her armour. Displacement, 18,800 tons; length between perpendiculars, 555 ft.; beam, 80 ft.; draught, 26½ ft.; S.H.P., 44,000. The designed speed is stated to be 25 knots, but this will certainly be exceeded, as the Indomitable class all attained a speed of about 27 knots on trial. The armament is the same as that of the Indomitables and Indefatigable, viz., eight 12-in. and sixteen 4-in. guns. The two centre turrets are *en échelon*, and, as in the Indefatigable, spaced further apart than in the Indomitables. One of the funnels is between them. The centre pair of guns have thus a considerably larger arc of fire than in the case of the Indomitables.

1911–12 programme.

Five armoured ships were provided in the programme of 1911–1912, but their commencement has been delayed owing to labour troubles and other causes. Of these the battleship Iron Duke was laid down at Portsmouth on January 15th, and the Marlborough at Devonport on January 25th, 1912. On the former £182,289, and on the latter £171,515, were to be spent by March 31st. Messrs. Cammell Laird & Co. have in hand the machinery for the Portsmouth ship, Messrs. Hawthorn, Leslie & Co. that for the Devonport ship, which will have boilers of the Yarrow type. The contracts for the two other battleships have been awarded—the Delhi to Messrs. Vickers, and the Benbow to Messrs. Beardmore—on, it is said, exceptionally favourable terms. The displacement of the four

battleships is believed to be about 25,000 tons, their length being 580 ft. The armament will comprise ten 13·5-in. guns of the new design, firing a shell of 1400 lb., as compared with one of 1250 lb. for the 13·5-in. guns of the Orion class. There will be a powerful secondary battery of 6-in. guns, probably mounted on the main deck behind armour. The contract for the remaining armoured ship (a battle-cruiser, to be named the Tiger) of the 1911–12 programme has been awarded to Messrs. John Brown and Company. The ordering of the Tiger was delayed for seven or eight weeks owing to reconsideration of her design, with the view of strengthening the vessel. The Tiger is of the same length as the Lion, but of greater beam, and the displacement approximates 28,000 tons. There will be the same modifications in the armament and its disposition as characterise the battleships of the year's programme.

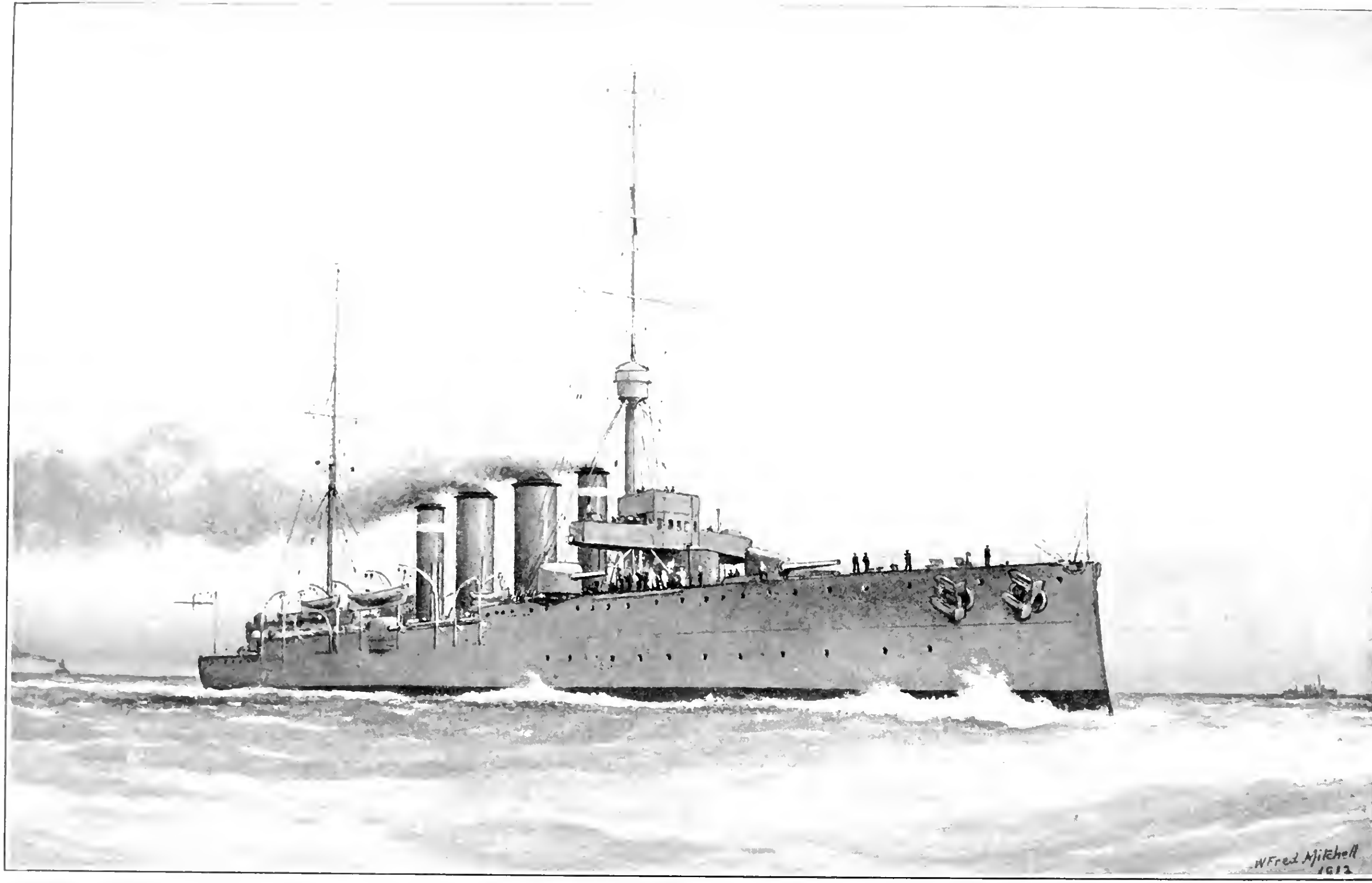
Second-class cruisers.

The four second-class cruisers of the 1909–10 programme, the Dartmouth, built and engined by Messrs. Vickers, the Falmouth (Messrs. Beardmore), the Weymouth (Messrs. Armstrong), and the Yarmouth (London and Glasgow Co.), have been completed. The Yarmouth was launched on April 12th, 1911; the three first-named were launched in the previous financial year. Displacement, 5250 tons; estimated speed, 24¾ knots; armament, eight 6-in. guns. Full particulars of these ships were given last year. The following is the result of their trials as taken from *Engineering*:—

Name.	24 Hours' Trial.		Full-Power Trial.	
	S.H.P.	Coal.	S.H.P.	Coal.
		lb.		lb.
Dartmouth	13,985	1·6	23,117	1·4
Falmouth	14,287	1·7	23,467	1·8
Weymouth	13,661	1·6	23,532	1·4

As to the speed realised, the performance of the first-named may be taken as typical. At 14,235 S.H.P., the mean speed was 23·49 knots; at 19,028 S.H.P., it was 24·95 knots, and at 23,550 S.H.P. 25·9 knots.

The three second-class cruisers of the 1910–11 programme belong to the Melbourne class. The Chatham, laid down on January 9th, 1911, was launched on November 9th of the same year; the Southampton is in an advanced state at Clydebank (Messrs. John Brown & Co.), and the Dublin, at Dalmuir (Messrs. Beardmore & Co.). The latter should be launched on April 16th and the former in



H.M.S. "DARTMOUTH."

May, coal strike permitting. These vessels show a further advance in displacement to 5440 tons. The designed speed is 26 knots, with 25,000 S.H.P. The armament comprises eight 6-in. guns and four 3-pdrs. We are now returning to the dimensions of the second-class cruisers completed in 1897. The Talbot class, of 5600 tons displacement, though originally designed to carry five 6-in. and six 4·7-in. guns, were subsequently armed with eleven 6-in. guns. The modern second-class cruiser has an advantage of more than 5 knots in speed on the Talbot.

The three second-class cruisers of the 1911–12 programme, one of which, the Birmingham, is building by Messrs. Armstrong, may carry an armament of ten 6-in. guns. The delay in ordering the Lowestoft and Nottingham is due to the desire of the First Lord to place the contracts with the Thames Iron Works. It will be far better to recognise, as Messrs. Thornycroft and Yarrow have done, that ship-building on the Thames, owing to high rates of wages and other reasons, is not commercially possible in competition with the northern yards. The award of the contract for the Thunderer to the Thames Iron Works was very doubtful policy. These cruisers will be completed in 1913–14.*

Third-class cruisers.

The Blonde, particulars of whose trials were given last year, was commissioned on May 17th, 1911. The Amphion, laid down at Pembroke in March, after the launch of the Active, was launched on December 4th, 1911. Displacement, 3440 tons; speed, 25 knots, and armament, ten 4-in. guns, as in their predecessors. The Active attained a speed of 26 knots on trial, with 19,498 S.H.P., and a coal consumption of 1·5 lb. The Naval Defence Act cruisers of about the same size carried two 6-in. and six 4·7-in. guns. In previous numbers of this volume attention has been called to the heavy cost of the Boadicea and later third-class cruisers. They are intended to act as parent ships to destroyers, but it appears somewhat difficult to justify the expenditure of nearly £300,000 apiece on vessels so deficient in fighting qualities.

The third-class cruiser of the 1911–12 programme, to be known as the Fearless, was laid down at Pembroke on November 15th, 1912. Displacement, 3360 tons; S.H.P., 18,000; speed, 25 knots. The machinery for this ship is being constructed by Messrs. Beardmore.

Destroyers.

There has again been an acceleration in the building of destroyers, which are now turned out within eighteen months from the date of order. When the last issue of the *Naval Annual* was published, eight boats of the Acorn class, of the 1909–10 programme, remained uncompleted. These have all been passed into commission, the last

* The Lowestoft and Nottingham are to be built in H.M. dockyards.

to be delivered being the Fury, on February 10th, 1912. The boats of this class were from designs by Sir Philip Watts, and there was not the variation in their details such as is to be found in earlier classes designed by the private torpedo-boat firms. The following description is quoted from an account of the trials of the Hope, built by Messrs. Swan, Hunter, and Wigham Richardson, Ltd., and engined by the Wallsend Company, which appeared in *Engineering*:—

Their length is 240ft., their beam 25ft. 3in., and their draught 7ft. 9in., when the displacement is about 780 tons. They are fitted with two tubes for firing torpedoes, and their armament includes two 4-in. quick-firing guns and two 12-pounders. They are thus more powerfully armed than their predecessors, and are, moreover, much more strongly built, with high forecastles, in order to maintain full speed in heavy seas.

The propelling machinery is of the Parsons reaction turbine type, and in all there are seven turbines—a high-pressure cruising, an intermediate cruising, a high-pressure main turbine, and two low-pressure turbines, these turbines all being for propelling the vessel ahead; in addition, there are two turbines for astern-going purposes, and these are incorporated in the casings of the ahead-going low-pressure turbines. There are three lines of shafting, and mounted on each wing shaft are one cruising, one low-pressure ahead, and one astern turbine. The high-pressure turbine only is connected to the centre line of shafting.

For cruising purposes, during which periods a low power is required, the steam is passed in series through the whole of the ahead-going turbines, commencing with the high-pressure cruising turbine, and it is under these conditions that the economical advantages of these cruising turbines become apparent. For full speed, both cruising turbines become inoperative units so far as propulsion is concerned. The low-pressure ahead and astern turbine alone are used in manœuvring, the centre turbine being idle.

For generating the steam there are four express water-tube boilers of the Yarrow type, entirely constructed at the works of the Wallsend Slipway and Engineering Company, Limited. They are the design and arrangement now usually adopted for this class of vessel, and have been so often described and illustrated in our pages that any description here would be superfluous. The fuel used for the boilers is a heavy oil, and that used for the trials was of the usual quality as supplied to the Admiralty.

Of the twenty-three destroyers authorised in 1910–11, including three for service in New Zealand waters, fourteen were designed at the Admiralty and nine by private firms. The former were similar to the Acorn type—of 750 tons displacement, carrying two 4-in. and two 12-pdr. guns, and with a speed of 27 knots. The latter, of about the same displacement, were of four special designs, each design differing as regards speed. Two 28-knot destroyers, the Archer and Attack, were ordered from Yarrow; two of 29 knots, the Acheron and Ariel, from Thornycroft; two of 30 knots, the Badger and Beaver, from the Parsons Co., in association with Denny and Bros.; and three of 32 knots, the Firedrake, Lurcher, and Oak, also from Yarrow. Of the fourteen boats of Admiralty design, the Ferret was commissioned on October 12th, 1911, the Sandfly and Hind in December, and the Forester and Defender in January, and most of the remaining boats have now been delivered. The Acheron was commissioned on November 1st, 1911. The Admiralty ordered that, as from December, 1911, the boats of the 1910–11 programme were to be formed into a new Seventh Destroyer

Flotilla, with the Venus as parent-ship, to be attached to the First Division of the Home Fleet. Thirteen of the twenty destroyers authorised in 1911–12 have been ordered, and tenders for the remainder provisionally accepted from eight firms, as follows:—

Messrs. Thornycroft and Co.	Hardy, Paragon, Porpoise, Unity, Victor.
,, John Brown and Co.	Acasta, Achates, Ambuscade.
,, Hawthorn, Leslie and Co.	Christopher, Cockatrice, Contest.
,, Swan, Hunter and Co.	Shark, Sparrowhawk, Spitfire.
,, London and Glasgow Co.	Lynx, Midge, Owl.
,, Denny and Bros.	Ardent.
,, Fairfield Co.	Fortune.
,, Parsons Turbine Co.	Garland.

The displacement of these boats will be from 920 to 935 tons, or about 140 tons heavier than that of the vessels of the two preceding programmes. They will have engines of 24,500 S.H.P., and will have a length of from 255 ft. to 260 ft. The speed will be 31 or 32 knots, with turbine machinery and oil fuel. The armament will consist of three 4-in. guns, in place of the two 4-in. and two 12-pdr. weapons of the Beagle and Acorn types. The Hardy, ordered from Thornycroft, will have, in addition to a turbine installation for high speeds, an installation of internal combustion engines on the Diesel system for use at cruising speeds. This boat will be 257 ft. in length, with a beam of 26 ft. 6 in., and will have a speed of 32 knots. The four other boats ordered from Thornycroft and Co., of the same length and beam as the Hardy, are designed for 31 knots speed. The contract date for the completion of these twenty boats is December 31st next.

The Admiralty, having learned in February that the torpedo-boat-destroyer programme of a Continental Power had been accelerated, invited tenders for twenty destroyers provided for in the 1912–13 programme, and the orders for these will have been placed before this issue of the *Naval Annual* is in the hands of the readers.

Five submarines were completed during 1911–12—viz., D 3, D 4, and D 5 at Barrow and D 7 and D 8 at Chatham. Of the former, D 4 was the first submarine completed for any navy to carry a gun for offensive purposes. The trials of this boat were carried out in the Irish Sea during November and were understood to have given satisfaction. The gun mounted, a 12-pdr., is placed under a hatch, the cover of which slides away, and the gun comes into view. After being fired, the gun is made to sink into the hatchway again, and the cover slides into its former position. The vessel was delivered at Portsmouth on December 2nd, and further trials have been made. D 6, of the same programme, is completing at Barrow. The six boats of the 1910–11 programme are the first of the "E" class, and were described in the *Naval Annual* last year. Of the six

Submarines.

authorised in the 1911–12 programme, three will be of an improved "E" class and will be built at Barrow. They will be longer and of greater girth than any previous submarine, and will mount two quick-firing guns. Their displacement will be about 1000 tons. Two other boats of the programme have been allotted to Chatham Dockyard. The sixth and last boat will be a submersible of the Laurenti type as constructed by the F.I.A.T. San Giorgio Company, of Spezia, and will be built by Scott's Shipbuilding and Engineering Co. The following description of the type appeared in *Engineering*:—

A feature of the Laurenti design is the construction of an outer hull to give the highest propulsive efficiency and reserve buoyancy on the surface, with the minimum of draught, and an inner hull to minimise the internal cubic capacity while ensuring satisfactory conditions when submerged. The double skin, which is braced with stays to ensure the maximum of structural strength, is confined largely to the central part, and the space between the shells up to the water-line on surface displacement is utilised to form water-ballast tanks for submergence. . . . Vertical bulkheads divide the interior into several compartments. The new British submersible boat will be of the twin-screw type, with twin six-cylinder F.I.A.T. engines in one engine-room, and electric motors, the latter for propelling the boat when submerged. The torpedo-tubes will be forward, under the bow, and the storage-tubes above.

The two river gunboats of the 1911–12 programme have been ordered from Messrs. Yarrow, and are to be named the Kingfisher and Rail.

Fleet auxiliaries.

The number of ships now maintained in commission as Fleet auxiliaries has risen to a very formidable total, and must absorb a not inconsiderable proportion of the manning resources of the Navy. Many of the first- and second-class cruisers of the Naval Defence Act period have had their armaments removed and been converted into depot ships for destroyers and submarines, mine-layers, etc. Is the removal of the armament always necessary? The Blakes and the Crescent class carried a powerful armament, and could fight, though they might not be able to catch the numerous second- and third-class cruisers in foreign navies.

The Maidstone, depot ship for submarines, of 3600 tons displacement and 14 knots speed, has been launched at Greenock. Two tenders for submarines, of 960 tons, are under construction at Messrs. Cammell Laird's, Birkenhead, one of which is due for completion by March 31st, 1912.

Two additional auxiliaries have this year been ordered—a torpedo boat-destroyer depot ship, named the Woolwich, from the London & Glasgow Co., and a hospital ship from Messrs. W. Beardmore & Co., Ltd. The latter will include every appliance which medical and surgical experience has evolved for the alleviation of the suffering of the sick and wounded. When complete for service the vessel will have cost considerably over £200,000.

The construction of the Australian Naval unit, which is to comprise one battle-cruiser, three cruisers, six destroyers, and three submarines, is progressing. The battle-cruiser Australia was launched at Clydebank on October 25th, 1911. Displacement, 18,800 tons; armament, eight 12-in. guns, sixteen 4-in. guns, and two 21-in. torpedo tubes. The ship is protected by a belt 8 in. to 4 in. thick, with 10-in. armour on the turrets. The designed horse-power of the Parsons turbines is 44,000 S.H.P.—rather more than that of the Indefatigable—and the speed should be greater. At normal draught it is expected that her sea speed will be 26 knots. The Australia should be completed towards the end of the current year.

Dominion Navies. Australia.

The second-class cruisers Melbourne and Sydney, which are being built by Messrs. Cammell Laird & Co., at Birkenhead, and by the London and Glasgow Company, at Glasgow, are in an advanced state. Displacement, 5440 tons; armament, nine 6-in. guns. They are sister ships of the enlarged Town class, of which the Chatham was launched in October, 1911. This type may be suitable for work in the Pacific, but in the seas of the Southern Ocean a larger vessel would be preferable. The Commonwealth Government has accepted the tender of the New South Wales Government for the construction of the third cruiser—to be named the Brisbane—as well as of the three remaining destroyers of the programme, at the State dockyard, Cockatoo Island, Sydney Harbour.

Of the three first destroyers of the programme, two were completed in Scotland and arrived in Australia last year; the third, the Warrego, was shipped in sections to Sydney, put together there, and launched in April, 1911. Two of the submarines are building at Barrow, and will be launched this year. The third has not yet been ordered.

Admiral Sir Reginald Henderson's report proposed the creation of an Australian naval unit, to consist of eight battle-cruisers, ten protected cruisers, eighteen destroyers, twelve submarines, three depot ships for flotillas, and a fleet repair ship. This fleet, when fully manned, will require approximately 15,000 officers and men. No further steps beyond these above recorded have yet been taken.

For the control of the Australian Navy, Admiral Sir Reginald Henderson proposed the creation of a Naval Board on the lines of the Board of Admiralty, to be composed as follows:—

Creation of Naval Board.

1. The Minister of State for Defence (or for the Navy, should a separate naval department be created later).
2. First Naval Member (to be a senior officer of the Commonwealth Navy not below the rank of captain).

3. Second Naval Member (to be a senior officer of the Imperial Navy not below the rank of captain).
4. Third Naval Member (to be a senior officer of the Commonwealth or Imperial Navy not below the rank of captain).
5. Finance and Civil Member (to be a Member of Parliament, of the Senate when the Minister is in the House of Representatives, and *vice versâ*).

Admiral Henderson further recommended that the Board should have a naval representative in London attached to the Staff of the High Commissioner, but with an office in the Admiralty building and the right of access to the members of the Admiralty Board. That section of Admiral Henderson's able report which deals with control and administration is reprinted in full in Part IV.

His recommendations have been approved; a Naval Board has been created, and the definition of its powers and functions has received official sanction as follows:—"The Naval Board shall, subject to the control of the Minister, be charged with the administration of all matters relating to the Naval Forces. The members of the Board shall act as a whole, its orders being issued over the signature of the Naval Secretary. All orders, etc., for the Naval Forces will in future be issued by the Naval Board through their Secretary, and are to be obeyed accordingly. Such orders will be issued to or through the Director of Naval Reserves, naval commandants, or the officer in charge of the destroyer service; and these officers may communicate direct with the Naval Board, addressing their communications to the Naval Secretary, Navy Office, Melbourne."

Canada.

Little progress has been made towards the creation of the Canadian Navy. The programme of Sir William Laurier's Government proposed the construction of four second-class cruisers, one third-class cruiser, and six destroyers, the whole to be built in Canada. Mr. Borden, the present Premier, stated in the Canadian House of Commons, on November 20th, 1911, that the proposal of the late Government called for an expenditure of £2,000,000 in ten years and planned a Fleet which would be useless as a fighting force and obsolete by the time it was completed. The whole question would be reconsidered. There is much force in Mr. Borden's criticism. If the Canadians wish to create a Navy, they must face the heavy expenditure necessary for the construction of modern battle-cruisers.

In the debate on Mr. Choquette's motion to repeal the Naval Act—which was defeated by fifty-one votes to two—Mr. Lougheed, Leader of Senate, speaking for the Government, said that the Conservative Party was not in agreement two years ago with the Liberal policy regarding the Navy, believing, as it did, that Canada's naval

programme should be along the lines of united action and central control in the Imperial Navy. This statement is very significant.

The first annual report of the Naval Defence Department states that besides the 21 naval cadets now under training, 223 recruits were registered, of whom 185 went to the Niobe and 38 to the Rainbow.

A site for the Canadian works of Messrs. Vickers is being prepared at Montreal. It will be completed this summer, when the building of the ship-repairing and engineering works will be commenced.

Naval airships and aeroplanes.

The large rigid dirigible airship constructed by Messrs. Vickers at Barrow for the Navy was wrecked in September. The airship was on May 23rd, 1911, taken out of the shed in which it had been constructed, for the first time. It was made fast to its moorings in the dock, and behaved admirably, in spite of the high wind which was blowing. It was subsequently taken back to its shed, where certain alterations were made, and it did not again emerge till the day of the accident. The delay, it is reported, was due to the difficulty as regards the supply of hydrogen. The weather was favourable on the morning of the accident, which is believed to have been due to the rupture of one of the gas-bags as the ship was being taken out of the shed. One hydro-aeroplane is under construction at Eastchurch, and two others are on order. A Deperdussin aeroplane has been purchased, and flew from Issy-les-Moulineaux to Eastchurch. Another airship has been ordered from Messrs. Vickers.

Docks.

The position as regards docks capable of taking the ships of ever-increasing size that are built or building for the Navy is not unsatisfactory, and, with the completion of the docks now in hand, will shortly improve. According to the First Lord, there are at present nine docks which can take Invincibles, Lord Nelsons and all earlier ships. Five of these, one of which is at Haulbowline, are suitable for the latest battleships. Two floating docks for the largest vessels that at present exist will be completed in a few months; one of these will be put in the Medway and the other ultimately at Portsmouth. Early in 1913 a new dock will be available at Portsmouth, another in January, 1914; and the three docks and the lock at Rosyth in 1916. Pending the completion of the docks at Rosyth the Admiralty are considering the advisability of towing one of the floating docks to Cromarty, and using it as a temporary subsidiary base until the large base on the north-east coast has been completed. There are five private docks which could be used to dock the largest vessel, and two more are being built. There are also four others which will take vessels of the Invincible class.

Naval gunnery.

The results of the Tests of Gunlayers and of Battle Practice are, as usual, given in Part IV. From the former it appears that the standard of shooting with heavy guns is about the same as last year. The percentage of hits to rounds fired is 50·01 in 1911 as compared with 51·85 in 1910 and 54·12 in 1909. In 1910 ricochets were counted as $\frac{1}{2}$ hit; in 1911 they were counted as $\frac{3}{10}$ hit. If in these two latter ricochets had counted as whole hits, the percentage of hits to rounds fired would be 54·86 in both 1911 and 1910, as compared with 54·12 in 1909 and 53·57 in 1908. The best ship in the Fleet is the cruiser Challenger, which obtained 90·76 points, the average hits per minute with the 6-in. guns being 7·64. The best shot in the ship, Leading Seaman J. E. Bennett, obtained the extraordinary number of 14·4 hits per minute. The Minotaur stands second in the list with 86·02 points, ten hits per minute being obtained by the best shot in the ship, Leading Seaman R. Russell, with a 7·5-in. gun. It is interesting to note, in the gunlayers' tests for 12-in. guns, that the five best ships are pre-Dreadnoughts. The best ship is the Russell with 2·31 hits per turret per minute, equal to 1·65 hits per gun per minute. The Queen and Britannia, second and third, obtained over two hits per turret per minute, while the Superb only obtained 1·76 hits per turret per minute.

Estimates 1912 13.

The Navy Estimates for 1912–13 amount to £44,085,400 as compared with £44,392,500 in 1911–12; the increases under the head of Pay, £115,500, Naval Armaments, £198,000, and Naval Works, £449,700, being more than compensated for by a decrease of £1,236,000 in the amount to be voted for Shipbuilding and Repairs. The First Lord, in introducing the Navy Estimates in the House of Commons, explained that owing to various causes there was a considerable sum unspent on new construction in 1911–12, which would involve increased expenditure in the following years.

New programme.

The programme of construction to be commenced in 1912–13 involves an expenditure of £1,903,000, and comprises four large-armoured ships, eight light-armoured cruisers, and twenty destroyers. Of the large-armoured ships two are to be built in the dockyards, and two by contract. On the former about £166,000 apiece is to be spent; the two latter will hardly be begun. The light-armoured cruisers are of quite a new type with high speed and little armament which will serve as the eyes of the Fleet. The two dockyard-built ships will be substantially advanced during the year. For the six contract-built ships only £12,000 apiece is taken, and they will hardly be laid down during the financial year 1912–13. £1,053,000 is taken for the twenty destroyers, which will consequently be well advanced. The programme of battleship construction is adequate

having regard to the fact that only one battleship and one battle-cruiser are to be laid down in Germany this year. The First Lord's speech, in which he states the margin that the Admiralty consider we should possess over Germany, and the battleship programme for the next few years, is printed in full in Part IV. It is the most noteworthy speech delivered by a First Lord of the Admiralty for many years. The frank and statesman-like way in which he dealt with German naval expansion has been universally approved in this country, and has not been resented in Germany by the weightier organs of the press. Mr. Churchill's way is the only way by which a reduction of armaments can be obtained.

Personnel.

The *personnel* is to be increased to an average of 136,000 men borne, and a further increase is foreshadowed in succeeding years. The strength of the Fleet Reserve is to be increased by 1500 men to 26,200. The numbers borne on January 1st were 24,153. At the same date there were 8441 men in the Pensioner Reserve. A new class of the Fleet Reserve, to be called the Immediate Reserve, is to be created, which is to have twenty-eight days' training annually. The establishment of the Royal Naval Reserve has been increased to 21,534, the increase being entirely in the new Trawler Section. The numbers borne show a small increase over last year. The Naval Volunteer Reserve is practically up to its establishment of 4100, the numbers borne on January 1st being 4063. The grand total of the numbers voted for the Naval Service is 196,291, of which less than one-third, or 60,291, are officers on half pay or officers and men in the various branches of the Reserve. The numbers borne on January 1st, 1912, were 190,846, including 500 officers and men lent to Colonial or Foreign Governments.

Officer

The first officers entered under the system of common entry have now reached the rank of Lieutenant. The conditions under which they may specialise are set forth in the First Lord's Memorandum. There has been considerable misgiving as to how far the system will succeed. It is possible that only a small proportion of the officers so entered will voluntarily enter the Engineer Branch, but it is hoped that this proportion will be sufficient for the needs of the Service. The system of common entry is held to work well in the United States Navy. It is, at any rate, certain that it is desirable that the executive officer shall possess sufficient knowledge of engineering to effectually command his ship, and that the large bodies of men in the engine-room shall be in charge of officers of equal standing to those on deck.

The shortage in the Lieutenants' list is to be partly met by the promotion of warrant officers. HYTHE.

CHAPTER III.

Foreign Navies.

France.

Improved administration.

No Navy has made greater progress during the last year than that of France. In nearly every department of naval activity there is evidence that the period of stagnation, suspense, and unrest is at an end. The Reports of M. Bos, M. Chaumet, and M. Bénazet drew the attention of Parliament to the deplorable condition to which the French Navy had been allowed to sink, and, under the able and vigorous impulse of Admiral Boué de Lapeyrère, steps were taken to place the administration of the Navy on a sound footing. Better collaboration has been established between various branches of the Service, the dockyards have been set in order, the period of construction much reduced, and a shipbuilding programme put in hand which will make the French Navy again a formidable naval force. The idea too long prevalent in France, that torpedo-boats, submarines, and the *guerre de course* could compensate for inferiority in the fighting line, has been abandoned. A new squadron of powerful ships has been commissioned. The manœuvres brought together an unusual number of vessels of all classes, and the great review outside Toulon on September 4th, when M. Fallières, accompanied by the Presidents of the Chambers and many of their members, saw the whole Fleet under way, was the most important French naval demonstration since M. Loubet reviewed the Fleet off La Ciotat in 1901. The terrible disaster to the Liberté on September 25th was a serious blow to progress, but the Navy has recovered its equilibrium, and the Naval Department has since made it a special care to prevent the recurrence of such calamities. M. Delcassé has proved a worthy successor to Admiral de Lapeyrère as Minister of Marine, and the immediate future of the French Navy is safe in his capable hands. Admiral de Lapeyrère is now in command of the Battle Fleet.

Command of the Mediterranean.

In a very notable report on the Estimates of 1912, in which he dealt with the Liberté disaster, questions relating to the high command, the central and dockyard administration, and other matters, M. Painlevé, the Budget reporter, raised the fundamental question of the real object of the French Fleet, which he described as the

command of the Mediterranean—*la maîtrise de la Méditerranée*. French resources, he said, did not permit France to rival Germany in her naval preparations, but they enabled her to command at least the western basin of the Mediterranean against the Fleets of Austria and Italy, which he further declared to be the essential object. In his view the disembarkation of an army corps, properly equipped and supplied, on the Channel or Atlantic coast is not an enterprise to be feared. It would present too many risks, in view of the presence of the coast flotillas and the length of time it would take. Even if it partially succeeded, the invaders would encounter the land forces, and unless they could seize some fortified place, in which they would be invested, they would be lost. Therefore, M. Painlevé regarded the hypothesis of an invasion by sea as chimerical, and moreover as promising to change in no respect the results of the war on land. The following passage from the report, although its conclusions are not undisputed, represents the ideas which at present dominate French naval policy :—

La maîtrise de la haute mer dans la Manche et dans l'Atlantique, si désirable qu'elle soit, ne nous est point indispensable. Au contraire, si elle nous échappait dans la Méditerranée occidentale, ce serait un désastre. La neutralité de l'Italie peut dépendre de notre puissance dans la Méditerranée. Si nous sommes faibles, l'appât de la Tunisie et la menace de l'Autriche contre laquelle nous ne pourrions l'aider à se protéger la détermineraient peut-être à intervenir contre nous. Or un débarquement sur la côte tunisienne serait autrement facile et dangereux que sur les côtes de France : si notre flotte n'est pas dans la Méditerranée, quel obstacle rencontrerait-il ? Mais une condition est indispensable : pour remplir sa mission, il faut que notre flotte soit entièrement concentrée à l'heure du combat. La vieille conception d'une flotte du Ponant et d'une flotte du Levant est une conception néfaste. Il importe de se rappeler la maxime de l'amiral Mahan : " Une flotte divisée en tronçons est une flotte gratuitement affaiblie et livrée à la défaite." Sans doute, si notre flotte était supérieure aux flottes réunies de la Triple Alliance, la disposition de nos côtes nous inclinerait à constituer deux armées navales : l'une à Brest, capable de tenir tête à la flotte allemande ; l'autre à Toulon, capable de tenir tête à la flotte austro-italienne ; mais, dans l'état actuel de nos forces, ce n'est là qu'un rêve dangereux de mégalomanie. Tous nos navires de haut bord ne doivent former qu'une armée navale. Pour qu'une telle armée soit entraînée aux manœuvres d'ensemble, pour que chaque navire remplisse automatiquement son rôle de combat, il faut que cette concentration soit *permanente* et il faut que domine l'idée que le champ de bataille naturel de cette armée est la Méditerranée. D'ailleurs, au moment de la revue navale, alors que l'heure pouvait devenir grave et que les intérêts de clochers faisaient silence, tous les Français ont eu la sensation que *la flotte était là où il fallait.*

M. Chautemps, in his report to the Senate relative to new construction, said that there was a change in the aspect of the dockyards owing to the better employment of the men and the introduction of new plant. The state of the Fleet was satisfactory, and construction, both in the dockyards and the private yards, was more rapid and more economical. The period allowed for the building of the new battleships is thirty-six months.

The six battleships of the Danton class, which were laid down in 1906–7, have been completed. Displacement, 18,028 tons; armament, four 12-in. and twelve 9·4-in. guns. Designed speed was 19¼ knots, with 22,500 S.H.P. These ships are driven by Ships completed.

turbine engines, and, as was to be expected with a type of machinery little known in the French Navy, there were a number of mishaps on their trials. These have now been concluded satisfactorily, considerably more than the designed speed having been realised in all cases. The ships with Belleville boilers did better than those with Niclausse boilers. The following particulars are taken from *Le Yacht*, which comments on the heavy coal consumption at low speeds, and other Service papers:—

		24 Hours.		10 Hours.		3 Hours.	
	Boilers.	S.H.P.	Speed.	S.H.P.	Speed.	S.H.P.	Speed.
Danton	Belleville	...	18·16	...	19·44	29,650	20·18
Diderot	Niclausse	14,668	18·26	20,230	19·48	22,150	19·75
Condorcet	,,	...	18·3	...	19·31	...	19·8
Mirabeau	Belleville	...	18·27	...	19·73	...	19·73
Vergniaud	Niclausse	...	17·74	...	19·15	...	19·67
Voltaire	Belleville	...	18·63	...	19·78	...	20·66

It is very noteworthy that the steam trials of most of these ships were carried out in a very few days, instead of dragging out for many months, as has been the practice hitherto in the French Navy.

M. Painlevé states, in his report, that the Danton class during the manœuvres consumed two and a half times as much coal as the Patries.

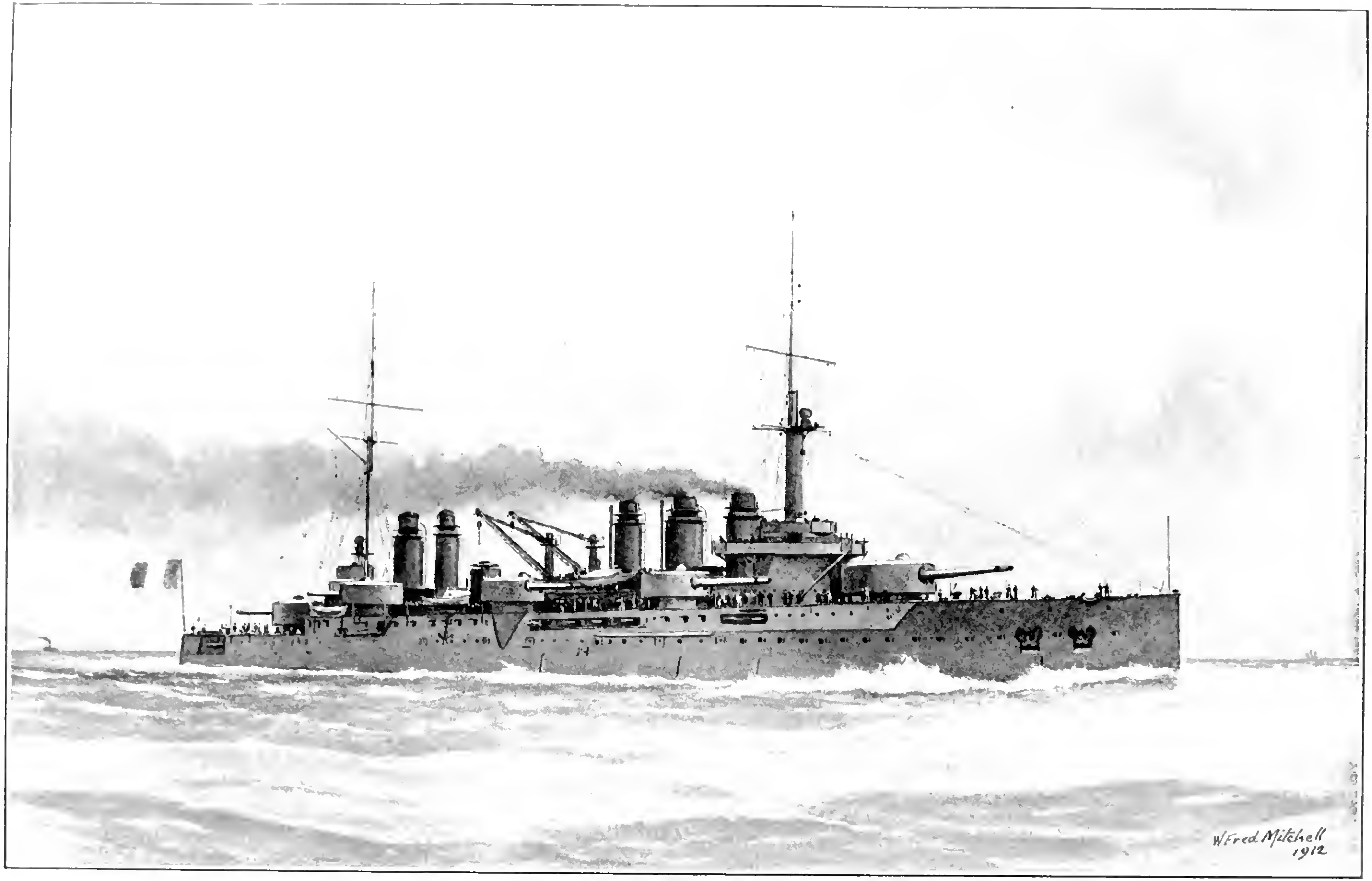
The gunnery trials of these battleships are also reported to have passed off satisfactorily. The turrets are less cramped than in preceding French battleships, and, with improved loading arrangements, a more rapid rate of fire has been attained—two rounds from the 12-in. and three rounds from the 9·4-in. guns per minute. The weight of a single broadside is 6776 lb. The broadside fire per minute is considerably superior to that of the Dreadnought, and slightly inferior to that of the Neptune, the German Nassau class, and the United States Delaware. These ships are well protected by a complete water-line belt 10 in. thick amidships.

Armoured cruisers.

The armoured cruisers Edgard Quinet and Waldeck-Rousseau, which were launched respectively in 1907 and 1908, have at last been completed. The Waldeck-Rousseau on her 10 hours' full-power trials attained an average speed of 23·10 knots, with 36,110 H.P. and a coal consumption of 1·94 lb. On the 24 hours' trial with normal draught the average speed was 21·62 knots, with 28,300 H.P. and a consumption of 1·5 lb.

Battleships under construction. Courbet.

The Courbet and Jean Bart, designed by M. Lyasse, were launched respectively on September 22nd and 23rd, 1911, at the Lorient and Brest dockyards. Length, 546 ft.; beam, 88 ft. 6 in.; mean draught, 29 ft.; displacement, 23,100 tons; S.H.P., 28,000; designed speed, 20 knots, which will probably be exceeded on trial. The main armament comprises twelve 12-in. guns in six turrets—two forward, two aft,



FRENCH BATTLESHIP "DANTON."

and two abreast amidships. Turrets No. 2 and 5 are raised, so that the guns in them can fire over the forward and after turrets. This disposition gives a broadside of ten 12-in. guns, while eight guns can fire ahead or astern. A feature of these ships is the powerful secondary battery of twenty-two 5·5-in. guns, protected by 7-in. armour. Eighteen of these are mounted on the upper deck, four of which can fire ahead, while four are mounted on the main deck below the after turrets, and can be fired right astern. The disposition of these guns will best be understood by a reference to the diagram. As regards protection, there is a complete water-line belt 11-in. thick amidships and 7-in. thick at the ends. The side above the belt from the forward turret to the after turret is protected by 7-in. armour up to the level of the upper deck. From the upper deck to the spar deck the ship is protected for over 200 ft. by 7-in. armour, with 7-in. athwartship bulkheads, forming an armoured redoubt for eighteen of the 5·5-in. guns above mentioned, and protecting also the bases of the funnels. There are three armoured decks—the lower, $2\frac{3}{4}$-in. thick; the main, 1·9-in.; and the upper, 1·2-in. There are four 18-in. submerged torpedo tubes; recent British battleships are fitted with 21-in. tubes.

Each ship will have twenty-four boilers, for using either coal or liquid fuel, those of the Courbet being of the Niclausse and those of the Jean Bart of the Belleville type. There will be two cruising turbines, two high-pressure and two low-pressure turbines for steaming ahead, and the same for going astern, driving four propellers. In some British battleships cruising turbines have been suppressed. The normal coal supply is 900 tons and the maximum 2700 tons, which will enable the ships to steam 8500 miles at 10 knots.

The cost of the Courbet and Jean Bart is set down at £2,604,000, or nearly £900,000 more than that of the Neptune. They are some 3000 tons larger, and must be pronounced in every respect most powerful fighting ships. They are well protected and well armed, they carry the same coal supply as British battleships, and though the designed speed is lower, the speed realised on trial and on service will probably not be far short of that of their competitors in other navies. The Courbet and Jean Bart are due for completion in May, 1913. They were laid down in November and October, 1910. If the anticipations are realised, they will have been completed in little over thirty months, an enormous improvement on previous rates of construction in France.

Two ships of the same type, the France and Paris, were laid down on August 1, 1911; the former at the yard of the Forges et Chantiers de la Méditerranée, La Seyne, the latter at the yard of the Forges et

Chantiers de la Loire at Saint Nazaire. These ships are due for completion in the last quarter of 1914, or in rather over three years from the date of laying down.

The programme.

The destruction of the Liberté has led to an alteration in the number of battleships to be laid down. The Naval Law, which proposes a fleet of twenty-eight battleships, ten scout cruisers, and fifty-one destroyers, has been sanctioned by the Chambers. Four ships of the programme have been laid down, as shown above (Jean Bart, Courbet, France and Paris), by yearly votes. Under Article 2 of the Law, vessels lost are to be replaced, and thus in 1912 three battleships will be laid down, followed in 1913 by two, in 1914 by two, in 1915 by four, and in 1917 by two. Two scout cruisers are to be laid down annually in 1917, 1918, and 1919. The money which it is estimated will be absorbed by the completion of the programme is proposed to be spread over eight years: £6,400,000 in 1912; £6,800,000 in 1913; £7,000,000 in 1914; and £7,400,000 in each of the years from 1915 to 1919; total £57,000,000. (For details of the programme see *Naval Annual* 1910.)

Battleships Bretagne, Provence, Lorraine.

The design of the three new ships to be laid down this spring shows a radical change in the armament. The Superior Council of the Navy decided, early in 1911, that a report on the merits of a 13·4-in. gun for the ships of 1912 should be presented, but before full trials had taken place a sketch plan of the ships was prepared, according to indications given by the Minister's Cabinet and the General Staff. The indications given to the technical authorities were that they should take the Jean Bart as the point of departure in their plans, but that the ships should mount ten 13·4-in. guns in five double turrets on the keel line, while the smaller armament would remain the same, as well as the torpedo armament and the protection. The disposition adopted for the main armament resembles that of the Orion. A single turret is placed amidships, with an arc of fire of 120 degrees on either side, instead of two turrets abreast with an arc of 180 degrees, as in the Jean Bart. The altered positions of the masts and funnels have led to some changes in the location of the secondary battery, consisting of twenty-two 5·5-in. guns, of which eighteen will be mounted on the upper deck behind 7-in. armour, fourteen being forward of the amidships turret, while four are mounted on the main deck beneath the after turrets. The diameter of the torpedoes will remain as in the Jean Bart, it being considered that with hot-air equipment the speed and range are what is required, while the charge is enough for all purposes. The displacement is increased to 22,637 tons. In *Le*

Yacht these ships are held to be too vulnerable to torpedoes and mines. They will be named Bretagne, Provence and Lorraine.

Of the eighteen destroyers (700–750 tons displacement), seven have been completed, and the following are still in hand, showing in brackets where they are being built and the date given for completion:—Bisson and Renaudin (Toulon, 1913); Protet (Rochefort, 1914); Commandant Lucas (Toulon, 1914); Capitaine Mehl (Lorient, 1912); Dehorter (Cherbourg, 1912); Francis Garnier (Lorient); Commandant Bory and Commandant Rivière (Lorient, 1912); Magon (Lorient, 1913); Mangini (Toulon, 1913). These boats carry each two 3·9-in. Q.F. and four 9-pdrs., and four torpedo-tubes. The designed speed was 31 knots. On trial this has been well exceeded, and the boats have behaved well in a sea-way. The speeds attained on trial are as follows:—Bouclier, 35·34 knots; Casque, 34·9 knots; Cimeterre, 33·75; Fourche, 33·8 knots. The Bouclier, which was engined by the Cie. Electro-Mécanique, attained the above result with 15,000 H.P. and a coal consumption of 1·46 lb. The smaller vessels, Enseigne Henry and Aspirant Herbert (450 tons, 28 knots), which are building at Rochefort, are to be completed this year. The flotillas.

Nine submarines are to be completed this year (Foucault, Euler, Franklin, Coulomb, Arago, Curie, Le Verrier, Clorinde and Cornélie); two are to be advanced (Gustave Zédé and Néréide); and nine are to be begun (Q 94 to Q 102), and are to be ready for trials February–May, 1914. The vessels named in the first list are developments and variations of the Pluviôse type, displacing about 400 tons. The Pluviôse is propelled on the surface by steam, and on trials attained 12·5 knots, while the later boats, with petrol motors, have travelled at 15 knots. They have also much greater range of action. The Gustave Zédé and Néréide, which are from the design of M. Simonot, will rise to a surface displacement of 780 tons, and have motor engines corresponding to a speed of 20 knots. Of the nine boats to be laid down in 1912, eight (Q 94 to Q 101) will displace 410 tons, with 181 ft. length and 16 ft. 9 in. beam, engines of 1300 H.P., surface speed 15 knots, and complement of three officers and twenty-four men. Q 102 will be larger—520 tons, 196 ft. 9 in. length, 17 ft. 9 in. beam, engines of 2100 H.P., surface speed 17½ knots, complement three officers and twenty-six men. Submarines.

A salvage dock for submarines has been launched at St. Nazaire. Length, 324 ft.; beam, 76 ft. It is constructed to lift weights up to 1000 tons from a depth of 28 fathoms.

The importance of Bizerta is increasing, and the port is to become the base for a squadron of six battleships, five armoured cruisers, Bizerta.

and a destroyer flotilla. Ships of the Danton class have been refitted there. The two docks are to be enlarged for ships of the new classes, and two large basins are projected.

Aux-iliaries.

The mine-layer Cerbère, 566 tons, 20 knots, is to be completed this year, and a coal transport, 3150 tons, 12 knots, is to be put in hand.

The Liberté disaster.

The destruction of the Liberté at Toulon on September 25th will be dealt with in detail and technically in Part III. of the *Naval Annual*, and therefore it is necessary here to do little more than give the sequence of events as they were observed by the other ships in the harbour. At 5.31 A.M. smoke was observed issuing from the embrasure of the forward starboard casemates of the Liberté. Two or three series of detonations were counted. A great volume of flame then broke out and reached the bridge, long tongues of fire leaping up to the fore-top. It was thought at the time that they were caused by the combustion of the small-calibre ammunition. This burst of flame, however, soon died down, and though red fire could be seen through the dense smoke, it began to be thought that the fire had been got under control. General quarters were heard sounded on board the Liberté, where a signal for assistance was seen flying; and many men having leaped into the water, the boats of the squadron were soon rescuing as many as could be pulled up. But at the sounding of general quarters, and the flames having died down, a number of men swam back to the ship and climbed on board. About ten minutes of uncertainty then passed, at the expiration of which, at 5.53 A.M., the ship suddenly blew up with a tremendous detonation, and fragments of her structure were propelled through the air in various directions and damaged several of the ships. The destruction of the Liberté was complete, and as the smoke cleared away she was seen to be a mere mass of wreckage. The loss of life was very great. At the time of the disaster the captain and second in command were absent on leave, but the senior officer present, Lieut. Garnier, gave the order to flood the magazines. So rapid, however, was the advance of the flames that the execution of his order seemed to be impossible, and it appears to be questioned whether the pressure of water was sufficiently great. The whole of the circumstances touching the disaster have been reported upon by a committee presided over by Rear-Admiral Gaschard.

The République was seriously damaged by flying wreckage. A mass of armour, weighing nearly a ton, struck her side 50 feet from the stern, staving in her plating, and damaging her near the water-line. Two projectiles, much small wreckage, and part of the Liberté's bridge also struck her, and an officer and some thirty men

were killed or wounded. The Démocratie and other ships were injured, and the captain of a training-ship was killed by a fragment as he stood on the bridge of his vessel watching the Liberté.

The manœuvres, which took the form of exercises, began on September 5th and concluded on the 16th, under the direction of Vice-Admiral Jauréguiberry, who had his flag in the Jules Ferry. With the exception of the Bouvet and the vessels employed in the training service, practically every serviceable vessel in the French Fleet was employed, and no French Admiral has ever had such a powerful force under his command. Moreover, with the exception of the Jules Ferry, Jules Michelet, Foudre and Casabianca, the whole of the vessels belonged to squadrons, divisions and flotillas which are now always in commission, and the four named are habitually assembled and exercise with nucleus crews under command of a rear-admiral. It was observed that a great number of voluminous orders and instructions were issued to the Fleet on the very eve of the operations, the inference being that the spirit of particularism in the squadrons has not yet been altogether eliminated, and a considerable number of exercises in tactics were intended to give cohesion to the Fleet. Each of the Admirals commanding the Battle Squadrons (Boué de Lapeyrère, Bellue, and Aubert) led in turn a fleet of fifteen or sixteen vessels into action with an adversary, after setting forth in a memorandum his intentions in the case presented to him. There were various exercises of distant blockade, or rather observation, giving rise to some interesting situations but no remarkable incidents, and showing the practical advance made by wireless telegraphy, signals being transmitted and received by both sides without their adversaries being able to interfere with them. The flotillas showed considerable enterprise, and some of the submarines made an excellent attack on the second squadron at a distance of twenty miles from the coast. There were four fighting exercises, in one of which fog descended and played an unexpected part. The tactical ideas of Admiral Fournier no longer dominate the French Fleet, and the object of the exercises was to determine the best use of the formation of ships in line ahead—the long line or the short line, the long single line and the short double line—and also the use of swift battle-cruisers, which were represented by armoured cruisers. The conclusions arrived at do not seem to be known, but it was pointed out that a French squadron of six ships would be unfavourably placed if engaged with a foreign squadron of eight. With regard to the swift cruisers, it appeared that they required

fully half an hour to reach the positions of advantage they desired, and when the Admirals endeavoured to economise this time by making dispositions in advance, they generally found their objects defeated.

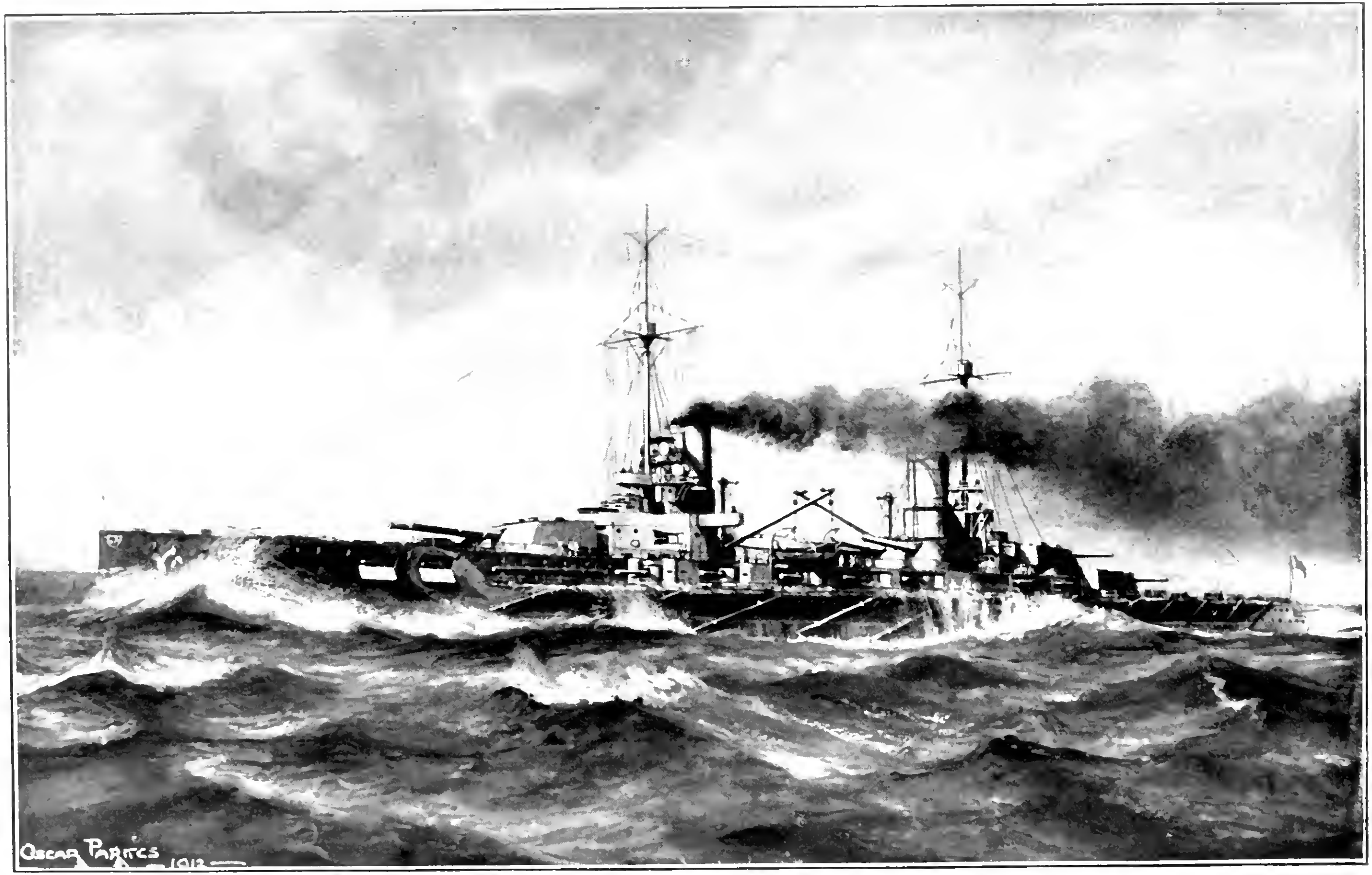
Germany.

Battleships.

The three battleships of the 1908 programme, Helgoland, Ostfriesland and Thüringen, have been completed, and have joined the High Sea Fleet. The Helgoland was laid down at the Howaldt Yard, Kiel, in December, 1908, the Ostfriesland at the Imperial Dockyard, Wilhelmshaven, in October, 1908, and the Thüringen at the Weser Yard, Bremen, in January, 1909. The period of construction was about thirty-three months. The speed of the three ships on trial exceeded 20 knots, and the machinery worked very satisfactorily. The Thüringen on trial steamed 21·07 knots with 34,000 H.P. The principal dimensions are as follows: Length, 546 ft.; beam, 93½ ft.; draught, 26½ ft.; displacement, 22,500 tons. There are three sets of triple-expansion engines, and the designed speed was 20·5 knots with 28,000 H.P. The armament comprises twelve 12-in. guns, which are all mounted at the same level on the upper deck. The turrets are distributed as in the Nassau class, viz., one forward, one aft, and two on either beam. This gives a broadside fire from only eight 12-in. guns as compared with ten guns in recent British battleships. There is a powerful secondary battery of fourteen 5·9-in. guns mounted behind armour on the main deck. Two of these guns can be fired ahead, and four astern. There are, in addition, fourteen 3·4-in. guns. Protection is afforded by a complete water-line belt, and by side armour carried up to the upper deck and extending from the funnel to the after turret. The normal coal supply is 900 tons, and the maximum supply 3000 tons. The complement consists of 1107 officers and men.

The fourth and last battleship of the Helgoland class, but of the 1909 programme, the Oldenburg, which was launched at the Schichau Yard, Danzig, on June 30th, 1910, has passed through her trials. She will probably be commissioned in April.

The two other battleships of the 1909 programme belong to a new type. The Kaiser was launched at the Imperial Dockyard, Kiel, on June 6th, 1911, and the Friedrich der Grosse at the Vulcan Yard, Hamburg, on March 23rd, 1911. Details of the Friedrich der Grosse were made public by the *Marine Rundschau* much earlier than has latterly been the practice in matters concerning naval construction in Germany. A great change is made in the design, and it may be presumed that she is the type-ship of a class which



GERMAN BATTLESHIP "KAISER."

will also include the König Albert, Kaiser, Kaiserin, and Prinz Regent Luitpold. The displacement is increased to 24,119 tons, and the deck plan closely resembles that of the British Neptune. The armament comprises ten 12-in., fourteen 5·9-in., and twelve 3·4-in. guns. There are three turrets on the keel line, each mounting two 12-in. guns, one of them forward, and one of the aftermost pair firing over the other. Two other turrets with the same armament are on either side echeloned, the aftermost of this pair being on the port side. The number of guns is thus reduced from twelve to ten, but there will be a full broadside, with ahead fire of six guns and astern fire of eight. The length of the ships will be 564 ft. 3 in., the beam 95 ft. 3 in., and the draught 27 ft. 3 in. The additional displacement is devoted to obtaining higher speed and range of action. The engine power is 25,000, to give a speed of 21 knots. The normal coal supply will be 1000 tons, but the total bunker capacity will be 3600 tons. The diagram and a photograph of the model show that the Friedrich der Grosse will have two pole masts of ordinary type, and two funnels standing between them, but each near one of the masts. The ship is to be completed for service in the autumn of the present year, when the Kaiser is also due.

Of the three battleships of the 1910 programme, the Kaiserin was launched at the Howaldt Yard, Kiel, on December 11th, 1911; the König Albert is building at the Schichau Yard, Danzig, and the Prinz Regent Luitpold was launched at the Germania Yard, Kiel, February 17th, 1912.

The three battleships of the 1911 programme have been laid down, the Ersatz Kurfürst Friedrich Wilhelm at the Vulcan Yard, the Ersatz Weissenburg at the Weser Yard, and "S" (an additional ship) at the Imperial Dockyard, Kiel. These ships are to be completed in the summer of 1914. The main armament will probably be composed of 14-in. instead of 12-in. guns. The Estimates of 1912–13 (prepared in December, 1911) provide, according to the Navy Law, for the laying down of a battleship to replace the Brandenburg.

Battle-cruiser Von der Tann.

Of the battle-cruiser Von der Tann (1907 programme) a description was given last year. On completion she was sent on a cruise to South America, and returned in time to take part in the Coronation Review at Spithead, when the present writer had the opportunity of visiting her. Her displacement and speed are about the same as those of the Indefatigable, viz., 18,700 tons and 27 knots. On trial she attained a speed of nearly 28 knots, and "Nauticus" reports that on the last stage of the return journey from South America—from Teneriffe to Heligoland—an average speed of

24 knots was maintained. The main armament of the Von der Tann consists of eight 11-in. guns as compared with the eight 12-in. guns of the Indefatigable, but any inferiority in this respect appears to be more than compensated for by a secondary battery of ten 5·9-in. guns, which the Von der Tann carries on the main deck behind 6-in. armour.

Moltke.

The battle-cruiser Moltke, of the 1908 programme, which was launched at the yard of Blohm & Voss, Hamburg, on April 7th, 1910, was completed last year. The following particulars, taken from "Nauticus," which differ in many respects from those given in the *Naval Annual* of last year, may be accepted as reliable:—Displacement, 22,600 tons; length, 610½ ft.; beam, 96½ ft.; draught, 27 ft. The armament comprises ten 11-in. guns mounted in five turrets, which are distributed as in the Neptune, but with the side turrets echeloned in the opposite direction; twelve 5·9-in. guns mounted in a main deck battery, and twelve 3·4-in. guns. This distribution gives a broadside fire from all the 10-in. guns and from six 5·9-in. guns. Six 11-in. and four 5·9-in. guns can be fired ahead, and eight 11-in. and four 5·9-in. guns astern. The weight of broadside of the Moltke is thus considerably superior to that of the Indefatigable. There are four torpedo-tubes. Reliable information as to the protection is not available, but the maximum thickness of the belt armour is probably 7 in., and that of the turrets 10 in. The Moltke, like the Von der Tann, is driven by Parsons turbines with 24 boilers. The designed speed was 25½ knots with 50,000 S.H.P. It is claimed that the ship has attained a maximum speed of 29·7 knots. On the measured-mile trials the speed was 28·4 knots with 86,000 S.H.P.* The Moltke is 4000 tons larger than the Von der Tann and the British Indefatigable, and being of later design is naturally superior to them in fighting qualities. She must be pronounced from every point of view a very powerful ship of her type.

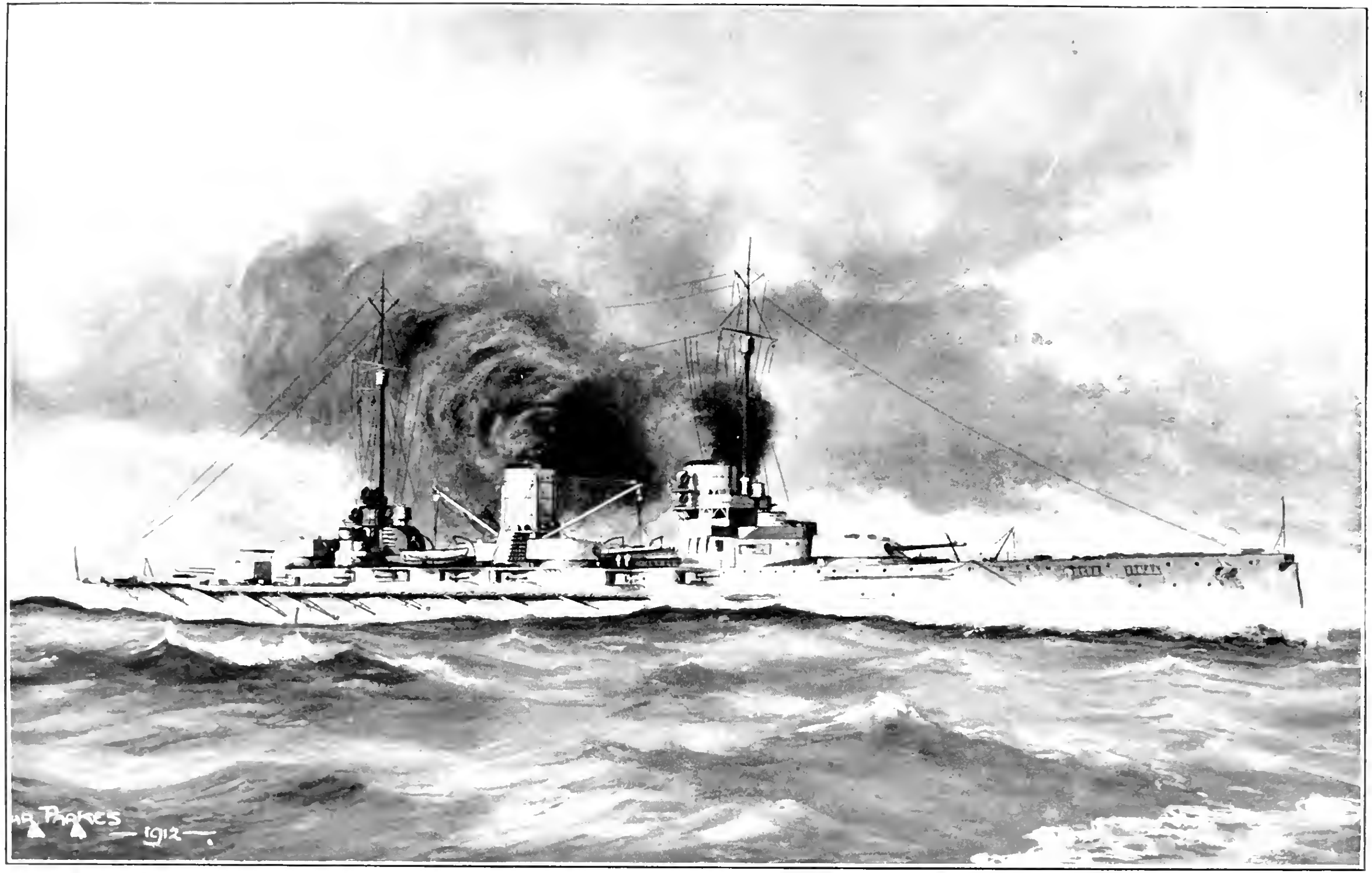
The Goeben, of the 1909 programme, which was launched on March 25th, 1911, at the Blohm & Voss Yard, is sister-ship to the Moltke. She is to be completed in the summer of this year.

The battle-cruisers Seydlitz (1910 programme) and K (1911 programme) are also building at the Blohm & Voss Yard. Another ship of the class, Ersatz Kaiserin Augusta, is in the Estimates of 1912–13. The Seydlitz was launched March 30th.

Protected cruisers.

The cruiser Magdeburg (Ersatz Buzzard) and Breslau (Ersatz Falke) were launched respectively on May 13th and 16th, 1911, the former at the Weser Yard, and the latter at the Vulcan

* Speed 27·25 knots on six hours' full-power trial. Cf. Chapter V.



GERMAN BATTLE-CRUISER "MOLTKE."

Yard, Stettin. These ships are believed to be of about 4500 tons displacement, and to carry an armament of two 5·9-in. and ten 4·1-in. guns. In size and armament they are thus practically the equals of the earlier vessels of the British Town class. Their immediate predecessors, the Köln, etc., are credited with a speed of 27 knots on trial. The speed of the Magdeburg will probably be the same.

The Stralsund (Ersatz Cormoran) and Strassburg (Ersatz Condor), of the 1910 programme, were launched in 1911, the former on November 4th at the Weser Yard, the latter on August 24th at the Imperial Dockyard, Wilhelmshaven.

Two cruisers of the same class, but of about 5000 tons displacement, were laid down in 1911—the Ersatz Seeadler at the Germania Yard in the summer, the Ersatz Geier at the Howaldt Yard, Kiel, in the autumn. Two similar cruisers, the Ersatz Irene and Ersatz Prinzess Wilhelm, are to be laid down in 1912. It is stated that these cruisers will mount 8·2-in. guns.

Torpedo flotilla.

Two divisions of six destroyers each are laid down and completed every year. G 186–191 and V 192–7 have been completed respectively at the Germania and Vulcan Yards, and are in commission. G 7–12 are under construction at the former, V 1–6 at the latter yard, the builders in each case supplying turbines of their own design. Twelve destroyers are being constructed by Messrs. Schichau; it is uncertain whether for the German or a foreign Navy. Twelve destroyers will be laid down in 1912, to be numbered 13 to 24.

Sixteen submarines, U 1–U 16, have been completed, of which one, the U 3, sank in Kiel Harbour. Twenty-five of the crew were saved; the commander, a lieutenant and a seaman, who with great heroism endeavoured to save the boat, were drowned.

The old gunboats Mücke, Skorpion, Crocodil, and Natter, the training vessels Rhein and Nixe, and the former despatch vessels Comet and Meteor have been removed from the list. The old battleship Württemberg is classed as a school ship, the Sperber as a gunboat, and the Schwalbe as a special service vessel. The old Moltke, depôt ship for submarines, has been re-named Acheron.

Estimates.

The Estimates for 1912 amount to £22,008,746, an increase of nearly £1,000,000 as compared with those for 1911. The ordinary permanent Estimates account for over £500,000 of this increase, there being a rise in nearly every item, owing to the expansion of the Fleet. The vote for new construction is practically the same as in 1911, viz., £7,906,508. The votes for armament show a large decrease, £3,887,057 in 1912, as compared with £4,335,440. "Other items," which include the construction and improvement of docks at Kiel, Wilhelmshaven, etc., have risen from £668,610 to £1,512,040.

Dock-yards and works.

The Estimates include charges for a number of works at the dockyards. For Wilhelmshaven a floating dock is to be built, and at the same port there is to be a new foundry for cast steel, the mechanical shops are to be enlarged, the dockyard railways and other communications are to be improved, and a tug is to be built. At Kiel the mechanical shops will be enlarged, and there will be improvements at Ellerbeck. Bridge and other communications will be improved in the inner harbour, and there will be important dredging in the outer harbour. The resources of the Danzig Dockyard are to be increased, especially for submarine-boat purposes. There is to be a tug for Heligoland; new moorings are to be laid out at Sonderburg, with fortified works; magazines are to be built at Mariensiel and Dietrichsdorf, near Wilhelmshaven, with improvements at those places. At Friedrichsort there is to be a new torpedo factory, the gun-mounting shop is to be enlarged, and provision is to be made for the supply of distilled water. Several mining vessels are to be built or others adapted for the purpose.

Supplementary programme.

An addition to the programme laid down in the existing Navy Law has been for some time under discussion. The proposals provide for the construction, in addition to the present programme, of three battleships, two small cruisers, and some submarines, the creation of a Third Squadron, and a considerable addition to the *personnel*. An additional battleship will be laid down in the first year, viz., 1913, and subsequently two others, so that the three may be completed by 1920. The addition to the programme of new construction is not as serious as at one time seemed probable, or as the agitators of the German Navy League desired. The German Reserve Squadron already consists of eight battleships, in addition to the Wettin, which is used as a training-ship. The formation of the Third Squadron for the High Sea Fleet will take the place of the Reserve Squadron, which in any case we had to be prepared to meet. The proposed addition of 75 officers and 1600 men annually to the *personnel* is really one of the most important features of the new programme.

Italy.

The Dante Alighieri, which was laid down in June, 1909, and launched at Castellammare on August 20th, 1910, has been through her trials.

Battleships building.

The three battleships laid down in August and September, 1910, have been launched—the Conte di Cavour at Spezia on August 10th, 1911; the Giulio Cesare at Ansaldo's Yard, Sestri Ponente, on

October 15th; and the Leonardo da Vinci at Odero's Yard, Genoa, on October 14th, 1911. They are down for completion at the beginning of 1913. The principal dimensions are as follows:—Length, 557 ft.; beam, 92 ft.; draught, 28 ft.; displacement, 21,500 tons. They have four propellers, driven by three groups of Parsons turbines, and the designed speed is 22 knots with 24,000 S.H.P. These three ships represent an entirely fresh departure as regards the main armament, which comprises thirteen 46-calibre 12-in. guns, mounted in five turrets. There are three three-gun turrets forward, aft, and amidships, and two two-gun turrets elevated, so that the guns in them can fire over the forward and after turrets. This distribution gives a broadside fire from thirteen guns, while five guns can fire ahead or astern. In addition the ships carry twenty 50-calibre 4·7-in. guns and fourteen 3-in. guns. They are protected by a water-line belt $9\frac{1}{2}$ in. thick amidships, tapering to $4\frac{1}{2}$ in. at the ends, and by a $1\frac{3}{4}$-in. armoured deck. The turrets are protected by $9\frac{1}{2}$-in. armour, and the 4·7-in. guns by $4\frac{3}{4}$-in. armour. The normal coal and oil supply is 1000 tons. The complement is given as 44 officers and 950 men.

New programme.

The battleships F and G, which have just been laid down in the dockyards at Spezia and Castellammare, are to be named Andrea Doria and Duilio. They will be improved Cavours, better protected, and mounting 12-in. and 5·9-in. guns. The following particulars have been given:—Displacement, 21,500 tons; length, 570 ft.; beam, 91 ft.; draught, 29 ft.; main armament, probably thirteen 12-in. (46-calibre) guns in five turrets; protection $10\frac{1}{2}$–6-in. armour. H.P., 38,000; speed, 23 knots; turbine machinery.* Two others are projected, to be built in private yards, and may carry 14-in. guns.

Scout class.

The scout-cruiser Quarto was launched at Venice on August 19th, 1911. Length, 432 ft.; beam, $42\frac{3}{4}$ ft.; draught, $13\frac{1}{4}$ ft.; full load displacement, 3250 tons. The armament consists of six 4·7-in. guns and six 3-in. guns. There are two above-water torpedo tubes. The ship is driven by two groups of Parsons turbines, each group having one high-pressure and one low-pressure turbine, with ten Blechynden boilers, eight for liquid fuel and two for mixed stoking. The designed speed is 29 knots, with 22,500 S.H.P. The normal fuel supply is 425 tons of naphthalene and 25 tons of coal. The complement will be 12 officers and 185 men. A sister-ship, the Nino Bixio, was launched at Castellammare on December 30th, where the Marsala has since been put into the water.

San Giorgio.

The armoured cruiser San Giorgio ran on the Gajola reef off Posillipo Point, in the Bay of Naples, when returning from a trial on

* Dimensions and speed given are reliable. Other particulars doubtful.

August 12th. At the time of the disaster it is calculated that the cruiser displaced 10,450 metric tons, corresponding to a draught of 7·47 m., while the reef was at a depth of from 6·8 m. to 5·8 m. She was driven by her impetus so far over the reef that the stern was raised 9 ft. above the normal water-line, exposing the torpedo tube, and the ship heeled over 7 degrees to starboard. The rock penetrated the double bottom, the hull being crushed, and the framing driven in for a considerable distance. About 4300 tons of water invaded the boiler-room, magazines, and lower compartments. The armament was removed, and the guns and turrets were sent to the Armstrong factory at Posillipo, while every effort was made to lighten the ship by taking out the conning tower and removing some of the armour and other heavy weights.

Her situation was precarious, because she rested chiefly on the amidships third of her length, some of the after part being lifted clear of the water, and the forward part having little support. When efforts had been made to close the hull of the cruiser from the inrush of the sea, a measure which presented much difficulty, supports were built up where necessary, with the object of preventing straining of the hull. Several vessels stood by to render assistance, and the collective pumping power at work to keep down the water amounted to 15,000 tons per hour. Fortunately the weather was favourable, but the absence of tide placed the salvage workers at a disadvantage. The cruiser was divided into transverse compartments, and cement was employed to make them watertight. These arrangements were not entirely satisfactory, and in the case of the boiler-room the compressed-air system of excluding water was resorted to. At Castellammare, the Pattison yard, and elsewhere, several "camels," cylindrical in form, and each with an internal capacity of 350 tons, were made, analogous to those employed in the case of the Gladiator, and with this assistance the San Giorgio was floated. She was docked in the commercial harbour at Naples, where the present writer saw the extent of the under-water damage. A work that almost amounted to under-water reconstruction had to be taken in hand, and the cruiser is now almost ready for service. The *Rivista Marittima* remarks that, more fortunate than the Montagu, the Bedford, or the Sully, the San Giorgio's mishap took place in the neighbourhood of a dockyard and private works which presented every facility for assistance, to which circumstance unquestionably the salving of the vessel is due.

Flotillas. Of the six destroyers of 650 tons, built by Messrs. Pattison at Naples, some are nearly completed and some are in service. They

are 30-knot boats, with oil stoking, and are named Impavido, Impetuoso, Indomito, Insidioso, Intrepido, and Irriquieto. Messrs. Orlando are building four others at Leghorn—the Ardito and Ardente, with Parsons turbines, and the Audace and Animoso, with Zoelly turbines.

Thirty-two coast-defence torpedo-boats of 120 tons, provided for in 1909, are in hand as follows, several of them having been launched:—1 P.N. to 12 P.N., oil stoking (Pattison, Naples); 13 O.S. to 24 O.S. (Odero, Genoa); 25 A.S. to 32 A.S. (Ansaldo, Genoa).

The F.I.A.T. San Giorgio Company, at Spezia, have completed the submarines Medusa, Velella and Argo, launched complete (250–300 tons, 13–8·5 knots), and five others are in hand—Falea, Fisalia, Fantina, Salpa and Zoea. The Atropo has been built at the Germania Yard, Kiel (330 tons, 13 knots). The Galileo Ferraris and Giacinto Pullino have been begun at Spezia (Cavallini type, 400 tons, 18–14 knots). The Nautilus and Nereide are being built at Venice. Submarines.

The river-gunboat Sebastiano Caboto (800 tons) is in hand, and a surveying vessel, Ammiraglio Magnaghi, 1800 tons, 14 knots, is to be built.

The Turkish vessels Thetis and Derna, which were captured at the beginning of the war, have been added to the Italian Navy under the names of Capitano Verri and Bengazi. Captured vessels.

The Navy Estimates for 1912–13 amount to £8,675,000 as compared with £7,808,000 for 1911–12. Under the head of ordinary general expenditure there is an increase of £50,000 for pensions and £176,000 for subsidies to the Mercantile Marine (the latter possibly due to the number of ships taken up for the war in Tripoli). The ordinary expenditure for naval services stands at about the same figure as last year, viz., £6,473,000. All the items for pay, victualling, etc., show considerable increases, but these are compensated for by the disappearance of £400,000 expended last year under the law of June 27th, 1909. The vote for new construction amounts to £2,400,000, an increase of less than £60,000 over the amount voted in the previous year. There is, however, in addition a supplementary vote for shipbuilding of £177,303, and it is proposed to spend £400,000 on purposes other than shipbuilding. Navy Estimates.

Austria-Hungary.

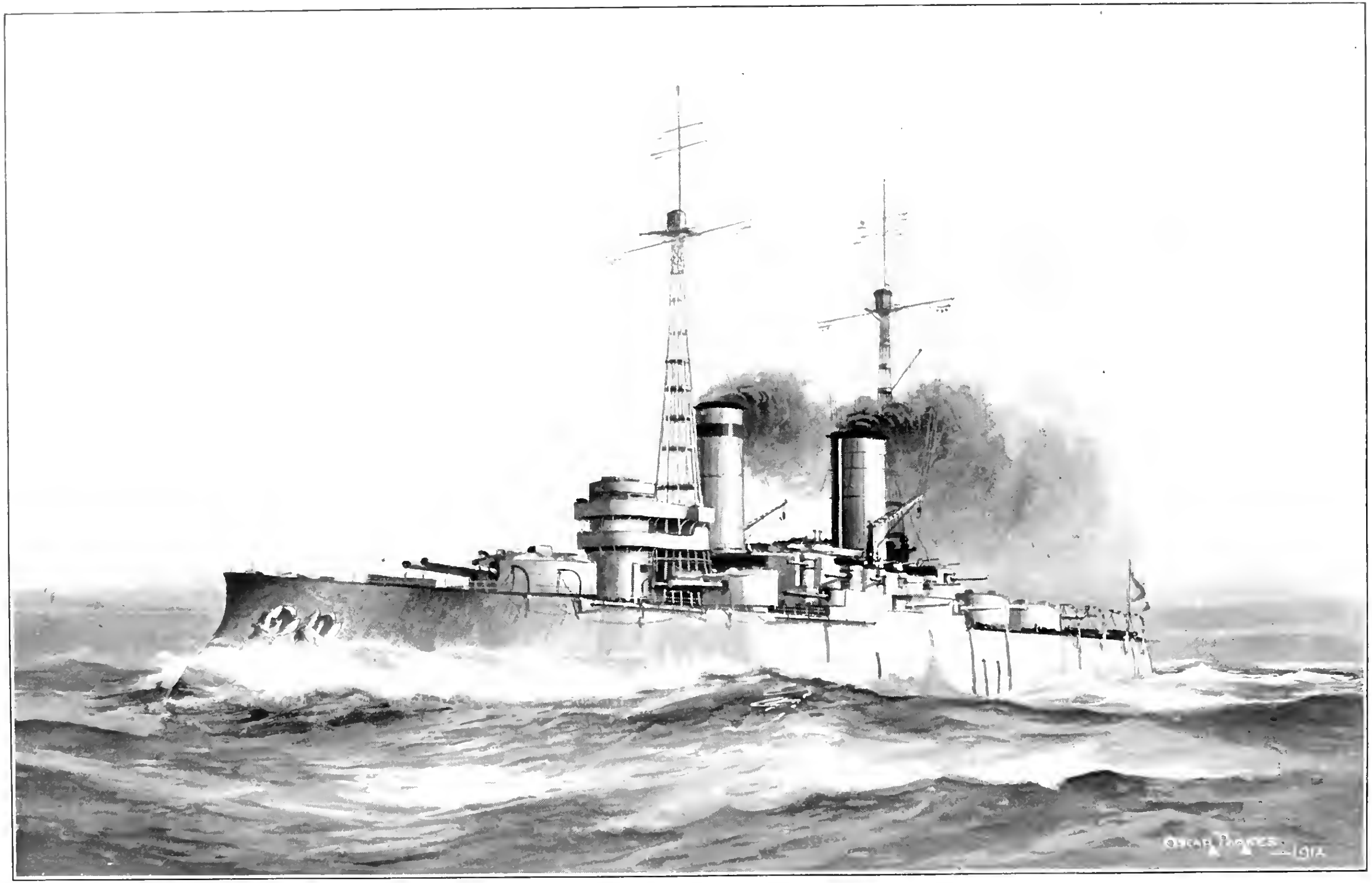
The Zrinyi, last of the three battleships of the class, has been completed, and joined the fleet on August 31st, 1911.

The Viribus Unitis (IV.), the first of the four battleships of the

new Austrian programme, was launched at the Stabilimento Tecnico, Trieste, on June 24, 1911. At the date of the launch she had been eleven months in hand, and was advanced to the extent of 45 per cent. On December 1 the percentage was 70. Some particulars of these ships were given last year. Length, 495 ft.; beam, 89 ft. 6 in.; mean draught, 27 ft.; displacement, 20,000 tons. The main armament consists of twelve 12-in. guns, mounted in triple turrets on the centre line, two turrets at either end. The inner turret in both cases is elevated, so that there is a bow and stern fire from six 12-in. guns, while the weight of broadside is 11,904 lb. All the 12-in. guns have an arc of fire of 300 degrees. There is a secondary battery of twelve 5·9-in. guns, mounted on the upper deck between the turrets, protected by 6-in. armour, besides eighteen 2·8-in. (of which six are mounted on the higher turrets, and twelve are on the upper deck) and six smaller quick-firers. One hundred and thirty rounds are carried for each of the 12-in. guns, 200 rounds for the 5·2-in. guns, and about 2000 rounds for the quick-firers. There are three 18-in. torpedo-tubes. The hull is protected by a complete water-line belt 11 in. thick amidships, 4¾ in. thick at the ends. The side above the belt is covered with 6-in. armour from the forward turret to No. 3 turret. The turrets have 12-in. armour, and the protective deck is 2½ in. thick. The propelling machinery consists of three sets of turbine engines, with Yarrow boilers for coal or oil stoking. The designed speed is 20·5 knots, with 25,000 S.H.P. The full coal supply is 2000 tons.

No. V., being the second ship of the same class, was laid down at the Stabilimento Tecnico, Trieste, in August, 1910, and on December 1 had advanced 37 per cent. towards completion. She is named the Tegetthoff, and was launched on March 21st, 1912. Work upon this ship was retarded by a tidal wave and heavy storms. No. VI. was laid down on January 15th, 1912, on the slip vacated by the Viribus Unitis, and it seems doubtful if she can be launched this year, as was intended, owing to damage done by the great storm; but it is hoped that she will be ready for service in the summer of 1914. No. VII., being the fourth ship of the class, was laid down on January 29th, 1912, at the Danubius Yard, Fiume, where two large berths have been constructed, the aftermost part of them being cut out from the rock, and where extensive shops for shipbuilding purposes have been built. Hitherto the Danubius Yard has built only small vessels.

Cruisers. Three protected cruisers of the Admiral Spaun type, G, H, and J, are under construction. Displacement, 3500 tons. Engine power is increased from 21,000 to 25,000, and the speed from 26 to 27 knots.



RUSSIAN BATTLESHIP "IMPERATOR PAVEL I"

G is in hand at the Monfalcone Yard, near Trieste, and H at the Danubius Yard, Fiume, where J is to be built. Two berths for vessels of this class have been constructed by the Danubius Company.

Destroyers.

Under the Fleet Law, six destroyers of 800 tons are to be built, and the contract was given to the Danubius Yard, Fiume, April 1st, 1911. The boats were to be laid down in the autumn of that year. They will be oil-driven. Twelve destroyers of 200 tons are also provided for.

Submarines.

Seven submarines have been completed, and six others (U 8–U 13) are to be built. A submarine tender, the Vulcan, has been launched, and will have Diesel motors. The salvage vessel Hercules has been completed.

Refits.

The Habsburg has been refitted and partly reconstructed, and the Arpad and Babenberg are to be taken in hand. Three Austrian Lloyd steamers have been purchased, and are to be converted into hospital ships.

Floating dock.

The 22,500-ton floating dock for the new battleships has been completed, and was first used for the Viribus Unitis.

Personnel.

In 1911 there were 817 officers (of whom 180 were midshipmen and cadets), in addition to 702 officers of auxiliary corps—engineers, doctors, paymasters, etc. The crews numbered 14,328, including 328 warrant officers. The numbers are to be increased gradually to 18,500 in 1913.

Russia.

A very considerable change for the better has taken place in Russian Naval Administration during the past year. Vice-Admiral Grigorovitch has already proved himself to be a vigorous Minister of Marine. The Duma, now that the Administration has been set in order, have been liberal in granting the increased funds demanded for the Navy. An extensive programme of new construction is in hand, the supervision of which the Russian Admiralty have been wise enough to place in the hands of Messrs. John Brown & Co. and Messrs. Vickers.

The Navy Estimates for 1912 amount to £17,447,950. £7,616,850 are to be devoted to new construction, not including a supplementary estimate, £1,221,875, for the Black Sea ships.

Battleships completed.

The Imperator Pavel I., sister-ship to the Andrei Pervozvannyi, of which the completion was recorded last year, is, at last, now out of hand. She was laid down in 1903, and has consequently been eight years under construction. Displacement, 17,200 tons; speed, 18 knots; armament, four 12-in., fourteen 8-in., and twelve 4·7-in.

guns. These ships may be classed with the Agamemnon and Lord Nelson.

The Evstafi, also laid down in 1903, has at last been completed at Nikolaieff, on the Black Sea. Displacement, 12,733 tons; speed, 16 knots; armament, four 12-in., four 8-in., and twelve 6-in. guns. The sister ship, Ioann Zlatoust, is also completed.

Battle-ships launched.

The four battleships laid down in the spring of 1909 have been launched—the Sevastopol on June 29th, 1911, the Poltava on July 10th, the Petropavlovsk on September 9th, and the Gangut on October 7th. Particulars of these ships have already been given in the *Naval Annual.* Displacement, 23,000 tons. Main armament, twelve 12-in. guns, which are to be mounted, as in the Italian ships, in four triple turrets. The remarkable feature of these vessels is the speed, which is set down as 23 knots, with 42,000 S.H.P.

New programme.

Baltic.

The naval programme introduced in 1910 was based upon a very wide view of the situation, both in the Baltic and the Black Sea, and provided for a Fleet establishment, with building periods, dates for the obsolescence of ships, and the necessary increase of the *personnel.* The complete scheme proposed the construction of vessels up to the year 1920, and involved an expenditure of £70,000,000. The programme since put before the Duma involves an expenditure of £50,274,000, spread over five years. Four battleships or battle-cruisers, of 26,000 tons displacement, and mounting 13·5-in. guns, are to be laid down in 1912 for the Baltic. The programme also includes nine protected cruisers and thirty-six destroyers, and the completion of Reval as the principal base of the Fleet. The establishment of the Baltic Fleet is to comprise eight capital ships, viz., the four battleships launched in 1911 and the four ships above mentioned; twenty cruisers, thirty-six destroyers, twelve submarines, and mining, school and transport vessels.

Black Sea.

According to the programme the Black Sea Fleet must have one and a half times the strength of the fleet of the other Black Sea Powers. It has been decided to put in hand three battleships, nine large destroyers (said to be of 1100 tons), and six submarines. It was necessary to reorganise the shipyards, and accordingly the Belgian Company at Nikolaieff has enlarged its resources, in association with Messrs. Vickers, in order to build one of the new ships, the Ekaterina II., while Messrs. John Brown & Co. entered into a like arrangement with the firm of Ivanoff & Bunge, of Nikolaieff, at whose yard the Imperator Alexander III. and Imperatritsa Maria are being built. The following particulars of these battleships, which were officially laid down at the end of October, 1911, have been published:—Displacement, 22,500 tons; length, 551¼ ft.; beam,

$89\frac{1}{2}$ ft.; draught, $27\frac{1}{4}$ ft.; speed, 21 knots; coal supply, 3000 tons. The armament will comprise twelve 12-in. guns mounted in four triple turrets and twelve 6-in. guns. They will be fitted with turbine engines.

Torpedo craft.

In addition to the vessels indicated above there are in hand for the Black Sea nine destroyers, of 450 tons, and one submarine boat. Two other vessels of the latter class were to be built, but the money has been diverted to other purposes. For the Baltic Fleet, the torpedo-cruiser Novik, 1260 tons, a submarine of about 500 tons, and a submarine salvage vessel are under construction at the cost of the League for Strengthening the Fleet. The Novik was launched in July, 1911.

Caspian.

The gunboats Karo and Ardagan, five mine-sweepers (150 tons), and some transports have been completed.

Mining vessels.

The old ships Minin, General Admiral, and Gerzog Edinburgski, have been converted into mine-layers, as well as the Ladoga, Narovna, and Onega. The Ijorsky yard has delivered five mining vessels of 150 tons. In the Black Sea the transports Beresina and Shilka have been converted for the same purpose.

Vessels scrapped.

The following vessels have been removed from the list :—The old battleship Dvenadzat Apostoloff, the cruisers Admiral Korniloff and Asia, torpedo-boats Pronsitelny, Pylki, and 17 known by numbers, the submarine Forel, and many gunboats, transports and harbour craft.

Naval bases.

Reval is to be developed into a first-class naval base, with all the resources of a great dockyard. Quays and moles are to be extended in such a manner that the Active Fleet may be accommodated there. There are to be two dry docks for battleships, one for cruisers, and a double dock for torpedo craft, as well as a floating dock of 30,000 tons capacity. Machinery shops are to be built and supplied with new plant, and there are to be oil and coal depôts, stores, magazines, a hospital and other requirements of a dockyard. The port will be provided with defensive works on the sea and land sides, and with every equipment and supply for mine defence. Other docks for battleships, cruisers and destroyers are proposed for the use of the Second Active Squadron, and there is to be a supplementary base, well defended, and fully equipped for the fitting and coaling of ships. Kronstadt is also to be provided with greater facilities. New works are contemplated at Sevastopol, Nikolaieff (where a 30,000-ton floating dock is to be built from British designs), and Vladivostok, and on the coasts signal and wireless telegraph stations are to be established.

Mishap.

During manœuvres in the Black Sea, on October 2nd, the fleet was proceeding in line ahead when the Panteleimon took the ground

and received some damage. Coal and ammunition were removed, and the ship was towed off. The Evstafi also touched the bottom, but received little damage. A committee of inquiry, presided over by Vice-Admiral Sazarenny, held Vice-Admiral Bostroem, Commander-in-Chief, to blame, and he was relieved of his command.

United States.

Secretary's Report.

Mr. Meyer, Secretary of the Navy, in his Report for the year ending June 30th, 1911, refers with just pride to the increased efficiency and considerable economies effected in various branches of naval expenditure owing to the improved systems of administration recently introduced. "Under the present organisation," he says, "the work accomplished has been expedited with economy and unusual efficiency. Economy is shown by the fact that the effective material strength of the Navy has been increased within the annual, appropriations. Efficiency is shown by the facility with which business has been transacted."

The number of ships available for active service has been increased, as is shown by the following table:—

Vessels of the Navy Ready for Service, and those Undergoing Extensive Repairs at the end of Certain Calender Years.

Class of vessel.	1909		1910		1911	
	In active service or ready.	Repairing.	In active service or ready.	Repairing.	In active service or ready.	Repairing.
Battleships	17	10	18	11	26	5
Armoured cruisers	10	—	10	—	8	2
Cruisers	13	14	13	14	20	7
Gunboats	33	5	34	2	33	1
Colliers	19	4	17	2	21	1
Destroyers	9	11	18	9	35	—
Submarines	12	6	8	10	17	3
Total	113	50	118	48	160	19

The Secretary claimed that on March 15th, 1912, the percentage of the Battleship Fleet ready for active service would be 100 per cent. It is obvious that such a state of things will only be momentary; but in future it is provided that every ship shall have a stated period for overhaul. Much of the improved result is due to a great deal of repair work being done by the ships' crews. Improvements in engineering efficiency have been secured by the institution of competitive steaming tests between various classes of warships, and by

providing money prizes for the engineering crew of the ship showing the best results in speed and fuel consumption. "We are now maintaining," says the Report, "a Fleet about 20 per cent. larger than the one in commission two years ago, and are doing it with an appropriation under this Bureau of $400,000 less."

Considerable economies have been effected in the cost of docking, in the manufacture of articles of equipment, in the manufacture of powder, in the store-keeping system, etc.

Mr. Meyer visited the English dockyards and some of the principal private shipyards in the summer, and formed a very favourable opinion of the system of administration.

Battleships completed.

The Florida and Utah, which were laid down in March, 1909, have been completed. Displacement, 21,825 tons; speed, 21 knots; armament, ten 12-in. and sixteen 5-in. guns. These ships have already been described in the *Naval Annual*. The Utah is reported to have attained a speed of 21·6 knots on her trials with 28,477 S.H.P. She is driven by Parsons turbines.

Battleships launched.

The Wyoming was launched at Messrs. Cramp's Yard, Philadelphia, on May 25th, 1911. Her sister-ship, the Arkansas, was launched at the New York Shipbuilding Company's Yard earlier in the year. Displacement, 26,000 tons; armament, twelve 12-in. guns, in turrets on the centre line; speed, 20½ knots with 28,000 S.H.P. These ships are also fitted with Parsons turbines.

Battleships under construction.

Of the two battleships of the 1910 programme, the Texas was laid down at the Newport News Shipbuilding Co.'s Yard, and the New York at the New York Navy Yard, on September 11th, 1911. Length, 573 ft.; beam, 95¼ ft.; mean draught, 28½ ft.; displacement, 27,000 tons; speed, 21 knots with 35,000 S.H.P. The armament comprises ten 14-in. guns, in five turrets on the centre line, and twenty-one 5-in. guns. The arrangement of the turrets is similar to that of those of the Orion, the second and fourth turrets being elevated. Nineteen of the 5-in. guns are mounted on the main deck, ten being in a central battery protected by 6-in. armour. The remaining two 5-in. guns are mounted on the superstructure near the conning tower. The hull is protected by a complete water-line belt of 12-in. maximum thickness amidships. Above the belt is a strake of 9-in. armour up to the main deck and extending from the funnel to the after turret. The transverse bulkheads are of 10-in. armour. The armour on the turrets is 12-in. thick, that on the gun-houses 14-in. to 8-in. thick. In these ships the turbine has been abandoned for the reciprocating engine, which the Secretary states is about 30 per cent. more economical at cruising speeds and of about the same economy at high speeds.

The two battleships of the 1911 programme have been named Oklahoma and Nevada. The contracts have been awarded respectively to the New York Shipbuilding Company and the Fore River Shipbuilding Company. Displacement, 27,500 tons. The design shows a main armament of ten 14-in. guns, mounted in two double and two triple turrets. The Oklahama will be driven by reciprocating engines, the Nevada by Curtis turbines, both ships using only oil fuel.

No cruisers are under construction for the United States Navy.

Destroyers. The five Ammen class destroyers have been completed. The six Fanning class have been launched. All these destroyers are of 900 tons displacement and carry an armament of five 3-in. guns. The contracts for the eight destroyers of the 1911 programme have been awarded as follows:—Four to Messrs. Cramp & Sons (Zoelly turbines), two to the Bath Iron Works (Parsons turbines), and one each to the New York Shipbuilding Co. and the Fore River Co. (Curtis turbines). Displacement, 1040 tons; speed, 29½ knots, with 16,000 H.P.; armament, five 4-in. guns, the most powerful armament yet mounted in a destroyer.

Submarines. The names of submarines have been substituted by classes with numbers, the earliest boats being designated A1, A2, etc., the latest boats K5, 6, 7, 8. Fifteen boats are under construction, viz., G1–G4, H1–H3, K1–K8. K5–K8 were authorised in 1911. The H and K types are of about 500 tons displacement.

New programme. The programme, for motives of economy, is limited to the construction of two battleships and two colliers, which will barely maintain the strength of the Battle Fleet, but the Democratic caucus in Congress refused to vote any battleships at all. The Secretary put in an urgent plea in his Report for the construction of cruiser-battleships, scouts, and destroyers, besides repair and supply vessels, but did not suggest estimates for their construction. He considered that four destroyers and one scout should be laid down for every battleship, and that one supply ship and one ammunition ship are required for each squadron of eight battleships. Eight destroyers and two scouts should be therefore laid down every year.

Naval bases and docks. In the *Naval Annual* of 1910 the suggestions of the Secretary of the Navy for the suppression of the smaller Navy yards was referred to at length. The Secretary, in the Report for 1911 from which we have already quoted, again urges the necessity for the concentration and readjustment of the Navy yards. He says:—"If we were freshly confronted with the duty of locating and building the naval stations required in the Atlantic, without regard to existing stations, the interests of the nation and the Navy would be best served by the

establishment of one first-class naval station on the coast north of the Delaware, equipped for docking, repairing, and provisioning at least half the entire Fleet, and one station of the same capacity at Norfolk (Chesapeake Bay). This would be supplemented by a Fleet rendezvous at Guantanamo, with sufficient docking and repairing facilities to enable the Fleet to maintain itself in that vicinity for considerable periods, but not for extensive repairs; an ample torpedo-boat base at Charleston; a torpedo and submarine base at Key West; and a station for the large reserve fleet at Philadelphia."

Mr. Meyer's remarks relating to the Panama Canal, which is approaching completion, are worthy of serious note:—"The Panama Canal, which for all practical purposes will become a part of our coast line, and is destined to become the most important strategical point in the Western Hemisphere, makes a Caribbean naval base, with adequate docking and repair facilities, absolutely necessary. The best location for this station is Guantanamo Bay, Cuba, which we now hold. Assuming that we will continue to maintain an efficient Fleet, this base not only will enable us to control the Caribbean, with all its lines of approach to the canal, but, with a torpedo base at Key West, will render the Gulf of Mexico immune from attack."

The deficiencies in docking accommodation in the United States are great. There are more dry docks at Portsmouth than in all the Navy yards of the United States. Steps are being taken to remedy the deficiency. The two large docks at New York and Puget Sound will be completed in 1912; the third dock, which is under construction at Pearl Harbour, Mr. Meyer recommends should be lengthened to 1000 ft.

The Secretary urges the opening on a large scale of the Alaskan coalfield for naval purposes. The coal has been fully tested and found satisfactory.

Personnel.

An increase of 2000 men in the *personnel* is urged.

Voyage of Delaware

The new battleship Delaware accomplished two very remarkable performances last year. Between January 31 and April 25 she made the voyage of 17,000 miles to Valparaiso and back, stopping only at Rio on the return journey. On arrival at Boston, Captain Grove reported that no repairs were needed, and that the ship the day before had averaged 20 knots for $2\frac{1}{2}$ hours, with two boilers out of fourteen under forced draught. On June 4th the Delaware left New York for the Coronation Review, with 2747 tons of coal and 282 tons of oil. She took no supplies while abroad, and returned to Boston on July 9, with 607 tons of coal and 18 tons of oil remaining. The average speed was 11·85 knots.

Naval review.

In October a great naval review was held on the Hudson. Twenty-four battleships, four cruisers, twenty-two destroyers, sixteen torpedo-boats and eight submarines, besides other vessels, took part. At the same time twenty-four vessels of the Pacific Fleet assembled off Los Angeles, California. These reviews are said to have had a favourable effect on recruiting.

JAPAN.

In the *Naval Annual* last year, the special features of the Japanese shipbuilding programme were explained as well as the rapid obsolescence of vessels, indicating the need of a further programme, and the financial constriction that affected the preparation of such a programme. At a Cabinet meeting on November 24th, a compromise was arrived at, which appears to have been much more to the mind of the Minister of Finance than of Baron Saito, Minister of Marine. A scheme of construction covering the years up to 1920 was under consideration, involving an outlay not far short of £40,000,000, but it was decided to authorize an outlay of £9,250,000 only for 1912–17, making provision for the building of one battleship (Fuso) and three battle-cruisers, and, in view of the present heavy demands on the exchequer, to lay the chief burden on the years 1915 and 1916. The distribution of expenditure would be as follows: 1912, £250,000; 1913 and 1914, £1,000,000 each; 1915, £2,000,000; 1916, £4,500,000; 1917, £500,000. The economists thus secured their object of restricting immediate expenditure, and at the same time made a concession to the Navy Department. But the Minister of Marine is stated not to be content, and is reported to have said that the minimum programme, which ought to be commenced and completed between 1913–1920, was eight battleships and eight cruiser-battleships, as well as sixteen small cruisers, at a cost of over £35,000,000.

Battleships.

The battleship Aki, laid down in March, 1906, and launched in April, 1907, was completed in April, 1911. Displacement, 19,800 tons. She has a mixed but powerful armament of four 12-in., twelve 10-in., and eight 6-in. guns. The Settsu, laid down at the Yokosuka Navy Yard in January, 1909, was launched on April 1st, 1911. Her sister-ship, the Kawachi, was launched on October 15th, 1910. They are to be completed in the spring of 1912. Displacement, 20,800 tons; speed, 20½ knots. These ships carry an armament of twelve 12-in., ten 6-in., and twelve 4·7-in. guns. The battleship Fuso will be laid down at Kure. It is said that the displacement will be 30,000 tons, and that the ship will mount 15-in. guns. She is the first vessel of the new programme.

Four battle-cruisers are under construction. Displacement, 27,500 tons. The Kongo is building at Barrow. The Hiyei was laid down in October, 1911, at the Imperial Dockyard, Yokosuka; the orders for the Kirishima and the Haruna were placed in May, 1911, respectively with the Mitsubishi Company, Nagasaki, and the Kawasaki Shipbuilding Company, Kobe—two private firms which for the first time undertake large warship construction. Engineer Rear-Admiral Fujii, in a paper at the Jubilee Meeting of the Institute of Naval Architects, stated that three of these cruisers, including the Vickers ship, will have Parsons turbines, and the fourth Curtis turbines of 64,000 H.P. Armament, eight 13·5-in. and sixteen 6-in. guns. Three others, as is shown above, are to be laid down. Battle-cruisers.

The three cruisers Hirado, Shikuma and Yahagi have been launched. Displacement, 4800 tons; length, 475 ft.; beam, $46\frac{1}{2}$ft.; draught, $16\frac{3}{4}$ ft.; speed, 26 knots; armament, six 6-in., four 3-in. Cruisers.

The destroyers Yamakase and Umikase have been completed. Displacement about 1200 tons; speed, 35 knots. Two others of the class, Sakura and Tashibana, are in hand at Kure, of which the former was launched on December 20th, 1911. The Harusame, 374 tons, 29 knots, launched at Yokosuka in 1902, has been lost with officers and men. Destroyers.

Three submarines, Nos. 10, 11 and 12, have been launched.

The Toba, river-gunboat, was launched at Sasebo, almost complete, on November 7th.

The works at Chinhaiwan, which is to be the headquarters of the fifth naval district, approach completion. Makung has been equipped as a base for the flotillas. At the Mitsubishi Yard, Nagasaki, dock No. 3 is to be lengthened and widened for the reception of the largest ships. The dry dock at Sasebo, for vessels up to 30,000 tons displacement, has been completed. Harbour and docks.

SECONDARY NAVIES.

Argentina.

In a recent Memorandum communicated to the National Congress, Rear-Admiral Sáens Valiente, Minister of Marine, explained the situation of the Argentine Fleet, and gave his views as to the need of expansion, better training, and the provision of new resources. He strongly enforced the necessity of caring for the interests of officers and men, and said that their training was at least as important as considerations regarding material. Pay must be increased, seamen's

barracks must be built, and, more than all, manœuvres and exercises must not be restricted by want of supplies. Coal and ammunition must be provided in sufficiency for these objects. The Minister said that the ships of the Garibaldi class were in good condition, and were being reboilered at the national establishments. He added that there were a number of vessels which could be employed or converted for necessary auxiliary purposes. It was, however, necessary that there should be annual provision for the replacing of the obsolescent vessels, so that an established strength might be maintained. The "thermo-tank" system of magazine refrigeration was being installed in the Pueyrredon and Almirante Brown, and was to be generally applied. The contracts for the building of the two battleships were being punctually observed, and the steel supplied by the Bethlehem Company gave complete satisfaction. Twenty officers were attached to the United States Navy, and on their return were to be appointed to the new battleships. The Minister's report further stated that the naval development implied much work at the harbours and bases. At Bahia Blanca the plant must be modernised and increased, a dry dock must be constructed (for which the contract, it appears, has since been given to a German firm at a price of £1,400,000), and new magazines must be built, as well as houses and barracks for officers and men. In the La Plata river the bed of the stream must be dredged for the laying out of mooring berths, and at the naval establishment the machinery shops must be enlarged, petroleum tanks must be provided, and there must be a torpedo station and range as well as barracks and a hospital.

The Minister reported that the *personnel* included 516 executive officers, 106 engineers, 43 medical officers, 2 torpedo engineers, 17 electricians, 5 naval constructors, and 74 administrative officials. There were 7147 non-commissioned officers and men, and a corps of specialists for the new ships required to be created. The various classes of the reserve numbered 11,411 men.

The battleship Rivadavia, laid down May 25th, 1910, was launched at the Fore River Yard, on August 26th, 1911, and her sister-ship, the Moreno, on September 9th, at Camden, N.J. These ships were fully described last year. Length, 585 ft.; beam, 98 ft.; displacement, 27,600; armament, twelve 12-in. and twelve 6-in. guns; speed, $22\frac{1}{2}$ knots. The contract allowed twenty-four months and twenty-seven months respectively for the completion of these ships. It is unlikely that they will be completed within the contract time.

Twelve 32-knot destroyers have been launched, four in British, four in French, and four in German yards (two Germania and two Schichau). The Schichau boats, Cordoba and La Plata, it is reported,

both attained on their six hours' acceptance trials a mean speed of 34·7 knots, and the latter made a maximum speed for a considerable period of 36·8 knots.

Brazil.

The battleship Rio de Janeiro has been delayed by modifications in the design. She is in an early stage of construction at Elswick:—Length, 632 ft.; beam, 89 ft.; displacement, 27,500 tons. The armament comprises fourteen 12-in. guns in double turrets, twenty 6-in. guns, ten 3-pdrs., and three torpedo tubes. The hull is protected by a belt of 9-in. armour (K.C. and Armstrong), and by 9-in. and 6-in. armour on the side above the belt. The turrets have 9-in. armour, and the secondary battery is protected by 6-in. armour. There are three armoured decks (2 in., 1½ in., and 1 in.); Parsons turbines; Babcock and Wilcox boilers; machinery by Messrs. Vickers. Speed, 22 knots. Coal supply, normal, 1500 tons; maximum, 3000 tons. Complement, 1100.

The building of the third cruiser, Ceara, has been delayed. Three submersibles of the Laurenti type have been built at the F.I.A.T. San Giorgio yard, Spezia.

Chile.

The craze for the construction of monster battleships which has pervaded South America during the last few years has now reached Chile. The construction of two battleships was proposed. The despatch of the Delaware to Valparaiso last year was probably not unconnected with the fact that tenders for these ships had been called for. The tenders from British firms were considerably lower, as in the case of the Argentine battleships, than those of their competitors in the United States. In spite of the pressure brought to bear on the Chilian Government, Messrs. Armstrong have secured the order for one of these ships. Displacement, 28,000 tons; armament, ten 14-in. and twenty-two 4·7-in. guns.

Six powerful destroyers are being built by Messrs. J. Samuel White & Co., Cowes. Displacement, 1500 tons; length, 320 ft.; beam, 32 ft. 6 in.; draught, 11 ft. H. P., 27,000. Speed, 31 knots. Maximum fuel capacity, 80 tons oil and 427 tons coal. Armament, six 4-in. guns, two Maxims, and three 18-in. torpedo tubes.

China.

During the rising which brought about the creation of the Chinese Republic, the Navy generally supported the revolution and played an important part in the fighting on the Yang-Tse.

The training cruiser Ying-Swei was launched at Barrow on July 13th, and the Chao-Hao at Elswick on October 23rd. The latter is somewhat larger—2750 tons as compared with 2500 tons. Length, 330 ft.; beam, 42 ft.; draught, 13 ft. 3 in. Armament, two 6-in., four 4-in., and two 3-pdr. guns and two torpedo tubes. She will have Yarrow and cylindrical boilers, and Parsons turbines supplied by Messrs. Hawthorne, Leslie & Co. Speed, 22 knots. Maximum coal supply, 600 tons. Complement, 350.

A 400-ton destroyer is being built by Schichau at Elbing, and another at the Stabilimento Tecnico, Trieste.

An Admiralty yacht has been built and launched at Kiao-chau, named Wufong, and steamed at 14 knots on her trials.

Denmark.

Provision was made in 1911 for beginning a coast-defence ship of the Peder Skram type improved.

The torpedo-boat Soridderen, built by Messrs. Yarrow at Scotstoun, with between 4700 and 4800 H.P., attained a speed of 27·2 knots on her three hours' trial, or rather more than the contract speed. Yarrow boilers and Brown-Curtis turbines. The Soülven has been launched at Copenhagen, and the Flyvefisken has been delivered by Schichau. Three others of the class are in hand at Copenhagen dockyard and in the yard of Burmeister & Wain—230 tons, 27 knots.

Greece.

Provision is made by the Estimates of 1912 for building a new cruiser at a cost of £1,080,000, torpedo craft at a cost of £320,000, and the completion of the Salamina arsenal. It is intended partially to reconstruct and re-arm the ships of the Hydra class.

The submersible Delphin has been launched at Châlon-sur-Saône; 300–460 tons, 164 feet long, 14–9 knots, 5 tubes.

NETHERLANDS.

The Estimates of 1912 amount to a total sum of £1,730,992, being an increase of £12,847. To the former coast defence programme, another for the building of vessels for the defence of the Dutch East Indies has been added, which includes four armoured vessels. In 1912 the Estimates provide for the laying down of one of these vessels at the royal dockyard, Amsterdam—Displacement, 7480 tons; reciprocating engines of 10,000 H.P.; speed, 18 knots. Armament, four 11-in. 45-calibre guns in two double turrets, ten 4·1-in. guns, three torpedo tubes. Armour, 6-in. side and 10-in. barbettes. Four 180-ton 30-knot torpedo boats are also to be commenced in 1912.

Four destroyers, 480 tons, were laid down in 1911, and two others of the class, the Bulhond and Jackhals, are completing. These are of the same class as the Fret and Wolf. Four destroyers are to be completed in 1912, as well as three armoured gunboats.

Messrs. Whitehead have built at Fiume a submarine of improved Holland type—150 tons submerged, 105 ft. long, 10 ft. moulded beam, 300 H.P. Diesel engines for surface propulsion and 300 H.P. electric motor for use submerged, statical diving gear, two bow tubes, and four torpedoes, 3-ton drop keel, lifting eyes, outward connections for pumping in air, telephone buoy, submarine signal apparatus, etc. At the trials the greatest surface speed was 11·2 knots, range at 10 knots, 1000 nautical miles; endurance at 7 knots submerged, 6 hours 23 min.; at 8·6 knots, 3 hours, and at 11 knots, 1 hour. So great was the success that further orders were placed, so that of this type eleven boats are under construction, for one of which, 380 tons, the following guarantees have been given:—Greatest surface speed, 16 knots; range of 11 knots, 2600 miles; endurance submerged, at 11 knots, 1 hour, and at 8 knots, 3¾ hours. This boat is intended for the East Indies. Some of the boats are being built at Flushing under the direction of Messrs. Whitehead, and one of the 150-ton class has been launched. Two submarines are to be completed in 1912.

The two mine-layers provided for in 1910 have received the names of Medusa and Hydra.

NORWAY.

Early in January, 1912, the Ministerial Council presented to the Storthing a scheme of naval expansion, accompanied by a memorandum, in which the decline of Norwegian naval strength was indicated, and a warning given that the country could not depend upon the perpetual maintenance of peace, and be sure of keeping free from

international complications. The Fleet, it was stated, was no longer equal to its duties, and a programme of new construction must be adopted.

This programme proposes an established strength of eight coast defence armoured vessels, six destroyers, forty torpedo boats, twelve submarines, four gunboats, one mine layer, and other vessels converted for that purpose. The immediate object is to build at a cost of £900,000 two of the armoured vessels, of which the following particulars have been published:—Length, 295 ft. 3 in.; beam, 50 ft.; draught, 16 ft. 4 in.; speed, 15 knots. Armament, two 9·4-in., four 5·9-in., four or six 12 pdrs. or smaller guns, and two submerged torpedo tubes.

Sums of £50,000 are to be expended on improvements at the naval station in the Ofoten Fjord and of £35,000 on ammunition.

Peru.

The Peruvian Government have acquired by purchase the French armoured cruiser Dupuy de Lôme, 6676 tons, launched in 1890 and completed in 1893. She has received the name of Elias Aquirre.

Portugal.

On the institution of the Portuguese Republic, in the events leading to which the Navy took an active part, the cruiser Dom Carlos I, built at Elswick in 1898, was re-named Almirante Reis, and the Rainha Amelia became the Republica.

A Bill has been drafted by the Minister of Marine proposing to build for the Portuguese Navy three battleships and three scouts, besides torpedo vessels and submarines, at a total cost of about £8,800,000.

The small cruiser São Rafael, of 1800 tons, was wrecked in October. Only one life was lost.

A vessel for fishery protection, the Lynce, has been launched at the Orlando yard, Leghorn.

Spain.

The battleship España was launched on February 5th, 1912, by the Sociedad Española de Construccion Naval, a combination in which Messrs. Vickers, Armstrong and John Brown are interested. The Spanish Government, like the Russian Government, has been wise enough to secure the skill and experience of British firms in

carrying out their programme of new construction, and thus ensure that the ships laid down will be completed in a reasonable time. The España and her two sister ships are of 15,460 tons displacement; speed, 19½ knots; armament, eight 12-in. guns and twenty 4-in. guns. These ships appear to be of a very suitable type for a navy such as that of Spain. They would be improved if they carried a secondary battery of 6-in. guns. The Alfonso XIII. is making good progress at Ferrol, and the third of the class, Jaime I., has been laid down on the berth vacated by the España.

The gunboat Recalde has been launched at Cartagena, where two others of the same type are under construction. Displacement, 800 tons. Armament, four 3-in. guns. It is difficult to comprehend the purpose of building vessels of this kind.

The guns, mounting and armour for the ship under construction are supplied from England, the rest of the material is being made in Spain.

Sweden.

A proposal had been made for the construction of an armoured vessel of 6800 tons, and 22 knots speed, mounting four 11-in. and eight 6-in. guns, and having two torpedo tubes. Action has been suspended till a Parliamentary Committee appointed to inquire into the whole question of national defence has reported.

The submersible Hvalen, of 180 tons displacement, has been completed by F.I.A.T. San Giorgio Company at Muggiano, Spezia. She made the voyage to Sweden without escort, and covered the 790 miles from Spezia to Cartagena without stopping. Three boats of similar type are under construction at Muggiano for the Brazilian Navy.

Turkey.

The building up of the Turkish Navy was commenced by the purchase of two old German battleships of the Brandenburg class. The value of sea-power has been brought home during the war with Italy, and orders have now been placed with Messrs. Armstrong and Messrs. Vickers for the construction of two powerful battleships, the Reshad-i-Hamiss and Reshad V., the first of which has already been laid down at Barrow. Length, 525 ft.; beam, 91 ft.; displacement, 23,000 tons. The main armament will consist of ten 13·5-in. guns mounted in five turrets on the centre line. Sixteen 6-in. guns are mounted in an upper deck battery protected by 5-in. armour. The hull is protected by a water-line belt 12 in. thick amidships, tapering to 6 in. at the ends. Between the upper edge of the

belt and the main deck there is a strake of 9-in. armour, and between the main and upper decks a strake of 8-in. armour extending from the second to the fourth turret. The designed speed is 21 knots, with 31,000 H.P. They will be fitted with Parsons turbines.

Seven gunboats (510–420 tons) have been built in France, three by the Chantiers et Ateliers de la Loire and four by the Forges et Chantiers de la Méditerranée.

Owing to its powerlessness to take effective action, the Turkish Navy has played an inconsiderable part in the war. The larger vessels have been kept in the Golden Horn, but some torpedo boats have been destroyed and the old cruiser Avn-Illah and another vessel were sunk by gun-fire at Beyrout.

HYTHE.
JOHN LEYLAND.

CHAPTER IV.

COMPARATIVE STRENGTH.

THE outstanding features of the year are the growth and increase in the programme of the German Navy and the great improvement in the administration of the Navies of France and Russia, which have already resulted in a much more rapid execution of the shipbuilding programme and in a great increase in naval strength, and will have an even greater effect in the future. France and Russia will again become important Naval Powers.

For the British Navy four battleships have been completed, three battleships and four cruiser-battleships (including the Australia) launched. For the German Navy three battleships and one cruiser-battleship have been completed and three battleships launched.* France has completed six battleships and launched two, while Russia has completed three battleships and launched four. For Italy there have been launched three battleships, while her nominal ally Austria has launched one. Japan has launched only one battleship, but is entering on a new period of shipbuilding activity, one battleship and four cruiser-battleships having been laid down. The three more important South American Republics—Argentina, Brazil, and Chile—are all building battleships of the largest size. Turkey, which has had a severe lesson on the value of sea-power in her war with Italy over Tripoli, has ordered two powerful battleships. From the above summary it is evident that France has made the greatest progress of any Power in naval strength during the past year.

Ships in commission.

The Lists of Ships in Commission in European Waters have this year been divided into two categories. In the table on page 71 are given the Fleets in commission in Northern Europe, excluding the Fourth Division of the Home Fleet. From the figures given for British protected cruisers are excluded the sixteen third-class cruisers and scouts attached to the destroyer flotillas. The first, second, third, fourth and fifth flotillas each comprise three third-class cruisers or scouts, besides a depot ship. The seventh flotilla, which consists of only seven destroyers, whereas the number of the other flotillas varies from twenty-nine to twenty-five, has one. In another table are given the Ships in Commission in the Mediterranean. The Russian ships have been added to the former, those of Austria and Italy to the latter.

Apart from the substitution of recently completed ships for older vessels, there is little change in British and German Fleets in full commission. The First Division of the Home Fleet and the First

* Cruiser-battleship Seydlitz (ex J) was launched March 30th, 1912.

Squadron of the German High Sea Fleet (with one exception) now consist of the all-big-gun type.

Britain. The Hercules, Colossus, Orion, Monarch, and Agamemnon have taken the place of five King Edwards in the Second Division of the Home Fleet. By the end of the year the remaining King Edwards will be replaced by more modern ships. The battle-cruiser Lion will shortly join the First Cruiser Squadron in place of the Defence, which is ordered to China. The First Cruiser Squadron will then be entirely composed of battle-cruisers. The Indomitable has been transferred to the Second Squadron in place of the Shannon, which takes the place of the Bacchante in the Fifth Squadron.

The Third Division of the Home Fleet comprises nine* battleships (five King Edwards, the Irresistible, and three Majestics) as compared with eleven battleships last year, five armoured cruisers, four second-class cruisers, one third-class cruiser, and five torpedo gunboats, besides the cruisers and scouts attached to the Destroyer Flotillas. Forty-eight submarines organised in five sections are in commission with the Third Division of the Home Fleet.

The Fourth Division of the Home Fleet comprises eleven battleships (five Albions, five Majestics, and one Royal Sovereign), and nineteen cruisers, of which nine are of the first class. These ships can hardly be considered as ready for immediate service as the German reserve ships and have therefore not been included in the tables. The last Royal Sovereign must shortly disappear from the list. The Atlantic and Mediterranean Fleets each include the same six battleships as last year.

Germany. The First Squadron of the German High Sea Fleet is, with the exception of the Elsass, composed of battleships carrying twelve 11-in. or 12-in. guns as their main armament. The Second Squadron consists of Deutschlands and Braunschweigs—the Wittelsbachs, which have a main armament of 9·4-in. guns, having been transferred to the Reserve Squadron. The Deutschland has become the flagship of the Fleet. Attached to the High Sea Fleet are two Cruiser Squadrons, which include two cruiser-battleships, an armoured cruiser and five small cruisers. The Reserve Squadron has been increased from six battleships to eight, of which four Wittelsbachs form the North Sea Division and four Kaisers form the Baltic Division.

France. The French Fleet in Commission has been immensely strengthened by the completion of the six battleships of the Danton class. The Fleet is to be mainly concentrated in the Mediterranean and organised in three squadrons, to each of which a Cruiser Squadron consisting of three armoured cruisers is attached. In the First

* Eleven if the gunnery ships Majestic and Vengeance be included.

Class.	Great Britain.			Germany.		France.	Russia.
	Atlantic Fleet.	Home Fleet.	Home Fleet.	High Sea Fleet.	Reserve.	Third Squadron.	Baltic Fleet.
Battleships . .	Queen Prince of Wales Formidable Implacable Venerable London	1st Division. Neptune Dreadnought Bellerophon Superb Temeraire Collingwood St. Vincent Vanguard 2nd Division. Hercules Colossus Orion Monarch Agamemnon Lord Nelson Britannia Dominion *	3rd Division. King Edward VII. Africa Commonwealth Hibernia Zealandia Irresistible Cæsar Illustrious Prince George	Deutschland 1st Squadron. Ostfriesland Thüringen Helgoland Westfalen Nassau Posen Rheinland Elsass 2nd Squadron. Preussen Schleswig Holstein Hessen Lothringen Pommern Braunschweig Hannover Schlesien	North Sea. Wittelsbach Zahringen Mecklenburg Schwaben Baltic. K. Wilhelm II. K. Friedrich III. K. Barbarossa K. Wilhelm der Grosse	Bouvet Charlemagne Gaulois Carnot Charles Martel Jauréguiberry	Andrei Pervozvannyi Imp. Pavel Cesarevitch Slava
Armoured Cruisers. . .	5th Squadron. Shannon Argyll Black Prince D. of Edinburgh	1st Squadron. Lion† Indefatigable Inflexible Invincible 2nd Squadron. Indomitable Achilles Cochrane Natal Warrior	4th Squadron.‡ Berwick Donegal Essex Leviathan Antrim Roxburgh Carnarvon Devonshire King Alfred	Moltke Von der Tann Yorck		Gloire Condé Marseillaise	Gromoboi Makaroff Bayan Pallada
Protected Cruisers . .	3	4	12	5	2		
Destroyers . .		55	63	24	12	6	

* To be replaced by Thunderer. † When completed. ‡ In full commission.

Squadron there are six Dantons, and in the Second Squadron there are five Patries and the Suffren, which has taken the place of the ill-fated Liberté. The Third Squadron, which is to be attached to Brest, is composed of the six older battleships which last year formed the Second Active Squadron. In addition to the destroyers attached to the three Squadrons three Destroyer Divisions have been created, based on Oran, Ajaccio and Cherbourg.

Russia.

Russia has four battleships (including the two Imperator Pavel class just completed) and four armoured cruisers in the Baltic Fleet, and four battleships in the Black Sea. When the four Ganguts, launched in 1911, are completed, the Russian Baltic Fleet will become a serious factor in the balance of naval power in Northern Europe.

Italy.

The Italian Fleet in commission has been increased from six to eight battleships. The First Squadron comprises the four battleships of the Regina Elena class, and three armoured cruisers of the Pisa type. The fourth ship of the class, the San Giorgio, is under repair at Naples. The Second Squadron is composed of two Benedetto Brins and two St. Bons, with three armoured cruisers of the Garibaldi type and the old Marco Polo. A torpedo flotilla has been constituted of twenty-two destroyers and twenty-eight torpedo-boats, to which the armoured cruiser Vettor Pisani and five third-class cruisers are attached. The Dante Alighieri will probably take the place of one of the Regina Elenas in the First Squadron in May or June. The Italian Fleet is, as a rule, only in full commission for six or seven months.

Austria.

Austria has three battleships of 14,600 tons displacement in full commission, and three smaller battleships in reserve. The Austrian Navy is still somewhat inferior to that of Italy, and as the latter has got the start in the construction of big battleships is likely to remain so.

Situation in Northern Europe.

Having stated the number of ships available for war maintained in commission by the Naval Powers of Europe, we may now consider whether the strength of the various British squadrons is sufficient to meet any reasonably probable eventuality. The enormous expansion of German naval power during the past ten years, the evident determination of the German people to build up a navy which will seriously threaten the supremacy which we have for so long enjoyed at sea, and the fact that during the past year, owing to the support given to France on the Morocco question, the British and German nations were on the brink of war, compels us to consider this question mainly in relation to Germany. The first two divisions of the Home Fleet, which are practically always in full commission, are equal in numbers to the two squadrons of the German High Sea Fleet. The first division of the Home Fleet and the First Squadron of

the German Fleet, with one exception, are composed of all-big-gun battleships, and, so far as ships are concerned, may be taken to be equal in strength. The second division of the Home Fleet is, however, far more powerful than the Second Squadron of the German Fleet. The former includes the battleships most recently completed for the British Navy, and every ship in it is individually superior to any ship in the German Second Squadron. The third or reserve division of the Home Fleet is superior in numbers and in power, ship for ship, to the German Reserve Squadron, which includes only battleships having the 9·4-in. gun for their main armament. The Germans have little to set against the older battleships in the fourth division of the Home Fleet. The Atlantic Fleet, which is available for reinforcing our fleets in the Mediterranean or in the waters of Northern Europe, is not a very strong fleet, but is composed of battleships at least as powerful as the ships of the Second German Squadron. France and Russia have thus far been left out of consideration, but in a situation such as that which nearly led to trouble last year Germany would have to reckon with the French Fleet in the Channel, and presumably also with the Russian Fleet in the Baltic, the latter as yet not a very important factor. The fleets maintained by Britain in the waters of Northern Europe must on this review be pronounced sufficient to meet any reasonable contingency.

The Mediterranean.

In the table on page 74 are given the fleets in commission of the principal Naval Powers in Mediterranean waters. The British Fleet now consists of six not very modern battleships. Ten years ago we maintained a powerful fleet of twelve battleships in those waters and an agitation was raised for more.

In 1903 the Fleet was increased to fourteen battleships, but has since been gradually reduced to six, at which figure it has stood for the last five years. No modern battleship is included in the Fleet, which can no longer bear comparison with the French naval force in the Mediterranean now that the Dantons have been completed and the naval strength of France has been concentrated in those waters. There has been a tendency amongst certain writers to consider that, in the event of war with Germany, we must be prepared to face the combined fleets of the Triple Alliance. Though during the early stages of the war in Tripoli the sensational section of our Press did its best to destroy the cordial feeling which has so long existed in Italy towards this country, I still believe it impossible that Italy would willingly co-operate with her nominal allies in a war against Great Britain. Austria is Italy's hereditary foe, and Italian naval expansion is due to the growth of the Austrian Navy. The relations of Germany and Austria, on the other hand, are very intimate, and

it is not unreasonable to suppose that we might have to face an Austro-German combination. In such a contingency the British Mediterranean Fleet will certainly not be powerful enough to hold its own when the Viribus Unitis and sister ships are completed for the Austrian Navy. Modern battleships must then be added to it. Quite apart from our interests in Egypt, Malta, and Cyprus, the volume of British trade passing the Straits of Gibraltar is too important to allow the Mediterranean to become a *mare clausum* to British commerce.

	Britain.	*France.*	*Italy.*	*Austria.*
		1st Squadron.	1st Squadron.	1st Squadron.
Battleships	Cornwallis	Voltaire	Dante Alighieri*	Erz. Franz Ferdinand
	Duncan	Condorcet	Regina Elena	Radetzky
	Exmouth	Danton	Roma	Zrinyi
	Russell	Mirabeau	Napoli	
	Swiftsure.	Diderot		
	Triumph	Vergniaud	2nd Squadron.	Reserve.
			Benedetto Brin	Erz. Karl
		2nd Squadron.	Regina Margherita	Erz. Friedrich
		Patrie	Filiberto	Erz. Ferd. Max
		République	St. Bon	
		Démocratie		
		Justice		
		Vérité		
		Suffren		
Armoured Cruisers	Good Hope	Léon Gambetta	Pisa	St. Georg
	Hampshire	Ernest Renan	Amalfi	
	Lancaster	Edgar Quinet	San Marco	
	Suffolk	Jules Michelet	Garibaldi	
		Jules Ferry	Varese	
		Victor Hugo	Ferrucio	
Protected Cruisers	4	2	5	
Destroyers	10	12	22	

* Probably in June.

The table below gives the number of ships in commission and reserve for the principal European Navies :—

Year	Great Britain.					Germany.			Austria.			France.			Russia.			Italy.		
	Home.		Atlantic.	Mediterranean.	Total.	Battle Fleet.	Reserve.	Total.	Active.	Reserve.	Total.	Active.	Reserve.	Total.	Active.	Reserve.	Total.	Active.	Reserve.	Total.
	I & II Div.	III Div.																		
1903	10*	—	6	14	30	8	–	8	–	–	–	6	3	14‖	–	–	–	–	–	–
1906	16*	13	8	8	45	15	8†	23	–	–	–	6	3	15‖	–	–	–	–	–	–
1910	16	8	6	6	36	16	8	24	3	3	6	12	2	14	–	–	–	–	–	–
1911	16	11	6	6	39	16	6	22	5	3	8	12	2	14	–	–	–	6	–	6
1912	16	9	6	6	37	17	8	25	3	3	6	12	6‡	18	4	–	4	4	4	8

* Channel Squadron. † Coast Defence Ships. ‡ Third Squadron. ‖ Includes Northern Squadron.

Atlantic.

With the completion of the Utah and Florida the strength of the United States Atlantic Fleet is brought up to twenty-one battleships, as compared with sixteen battleships last year. It is organised in four divisions of five ships each, with a Fleet flagship. This Fleet includes all the completed battleships in Table I., with the exception of the Maine, but of these only six can be classed as Dreadnoughts. As the cruiser squadron comprises only two armoured and two protected cruisers, the Fleet lacks an important element of efficiency. It is none the less a formidable fighting force. A combination between the United States and Germany is, we hope and believe, out of the range of practical politics, but in such an eventuality it is clear that we are no longer up to the two-Power standard—a situation which we have long foretold in the *Naval Annual* would come about. The fortification of the entrance to the Panama Canal, which, it was understood, was to be open on equal terms to the commerce of all nations, the claim, quoted in the previous chapter from the Report of the Secretary of the Navy of the United States, to control the Caribbean Sea, in which we have important possessions, the endeavours to extend the political influence of the United States in the South American Republics, where we have interests of long standing, give some anxiety as to the future. It is at any rate clearly desirable that one of our Cruiser Squadrons, if not the Atlantic Fleet, should occasionally visit the West Indies and South America. The British Flag is not adequately represented in those waters by the rare visit of a small cruiser.

The limits proposed for the Atlantic Station of the Canadian Navy, under the agreement adopted at the Imperial Conference of last year, merit serious attention. The Station will include the waters north of 30 degrees North Latitude, and west of 40 degrees West Longitude —viz., not only Bermuda and Newfoundland, but the whole Atlantic coast of the United States, with the exception of Florida and the Gulf of Mexico. Newfoundland has entered a formal protest against being included in this arrangement; and the volume of trade of the Mother Country with the United States is so vast that it is doubtful whether she is justified in handing over the responsibility for its protection to other hands. Bermuda is valuable as a base for the protection of this trade, and should remain in British hands, at any rate for the present. When the organisation of the British Empire is perfected, and we are moving gradually in this direction, no Dominion Government will, it is safe to predict, make the reservations of Sir Wilfred Laurier as to placing its Naval forces in case of war at the common service. Our Oversea Dominions must stand in the Empire or outside it. War with any part must

mean war with the whole. The attitude of the present Canadian Government on Imperial defence is more reassuring than that of their predecessors.

Cape.

The Cape Squadron comprises, as last year, one second-class and two third-class cruisers. A powerful cruiser is needed on this important station. The Glasgow, which is attached to the Atlantic Fleet, shows the Flag on the West Coast of Africa and in South America.

Eastern waters.

The Japanese Fleet in commission comprises four battleships as compared with six last year, and five armoured cruisers as compared with two. It is organised in two squadrons, as follows:—

1*st Squadron.* — Battleships: Satsuma (flagship), Asahi, Kashima, Hizen. Armoured Cruisers: Tsukuba, Ibuki.

2*nd Squadron.* — Armoured Cruisers: Kurama, Nisshin, Kasuga. Protected Cruisers: Tone, Idzumi, Tsushima, Akitsushima.

The following is a list of the squadrons, excluding gunboats and torpedo-craft, kept in commission by the other principal Naval Powers in Eastern waters:—

	Great Britain.	*Germany.*	*France.*	*United States.*
Cruisers . . (1st Class)	Defence. Minotaur. Monmouth. Kent. Drake (A.)	Gneisenau. Scharnhorst		Saratoga.
Cruisers . . (2nd Class)	Newcastle. Highflyer (E.I.) Challenger (A.) Encounter (A.)	Leipzig. Nürnberg. Emden	Dupleix. Kléber.	Albany. New Orleans.
Cruisers . . (3rd Class)	Astræa. Flora. Fox (E.I.) Cambrian (A.) Pegasus (A.)* Pioneer (A.) Prometheus (A.)* Psyche (A.) Perseus (E.I.) Philomel (E.I.) Proserpine (E.I.)			

A. = Australia. E.I. = East Indies. * Sent temporarily to China.

The Australian Squadron has been strengthened by the substitution of the Drake for the Powerful. With this exception the squadrons set forth above remain much the same as they were a year ago. The new organisation of the three British Squadrons in Eastern waters will begin to take shape within the coming year. The Eastern Fleet, as it is to be called, will be composed of three squadrons, which will be combined from time to time for fleet exercises. The battle-cruiser New Zealand, presented by the Dominion to the Navy,

will become the flagship of the China unit. The Australia and the three second-class cruisers, Melbourne, Sydney, and Brisbane, of the Royal Australian Navy, with H.M. ships still on the station, will form the Australian unit. A third battle-cruiser is probably to be the flagship of the East Indian unit.

THE REORGANISATION OF THE FLEET.

This chapter was already in print when the First Lord introduced the Navy Estimates in the House of Commons, and described the proposed reorganisation of the Fleet. The ships available for Home defence are to be organised in three fleets and eight battle-squadrons. Each battle-squadron is to be composed of eight battleships, with their attendant cruiser-squadrons, torpedo flotillas, and all auxiliaries.

The First Fleet will consist of four battle squadrons. The First and Second Divisions of the Home Fleet become the First and Second Battle Squadrons. The Atlantic Fleet, based on Home ports instead of Gibraltar, and brought up during the year from six to eight battleships, will become the Third Squadron; and the Mediterranean Fleet, based on Gibraltar, ultimately raised to a strength of eight battleships (as has already been suggested will be necessary when the Austrian battleships are completed), will become the Fourth Squadron. To these four squadrons a Fleet flagship is to be added, as is the case in Germany, so that the Commander-in-Chief will not also command a squadron, as has been the practice hitherto in the organisation of the Home Fleet.

The Second Fleet will be composed of two squadrons, consisting of the ships in the existing Third Division of the Home Fleet. One of its squadrons will always be present in a Home port and ready to move "as soon as steam can be raised." The other will usually be in the same condition. The Third Division of the Home Fleet now comprises only eleven battleships. The Second Fleet will not for some years be brought up to the contemplated strength of sixteen battleships.

Ultimately, the First and Second Fleets will be composed of forty-nine battleships, available at the shortest notice and completely manned by the active service ratings of the Navy.

The Third Fleet will be composed of the ships now in the Fourth Division of the Home Fleet. It is in order that at least one squadron of this fleet may be available at short notice that the new section of the Fleet Reserve, referred to in a previous chapter, is to be created. The Fourth Division scale of manning will in future

only apply to the Eighth Battle Squadron, for which it is not proposed to provide full crews until it includes ships which are fit to send to sea.

The proposed reorganisation of the Fleet, of which the above account is summarised from the speech of the First Lord on March 18th, implies a still further concentration of the fighting force of the Navy in Home waters; and if the intention of the Admiralty is carried into effect, it means that the British Navy will be maintained in a better state of preparedness for war than it has ever been. It is to be hoped that the Fleet will not be kept tied to Home waters throughout the year, which cannot conduce to efficiency, and that squadrons will from time to time be sent on cruises to the coast of Spain or elsewhere. There is a sufficient margin of strength over the German Fleet in commission to enable this to be done, for the reasons given in a previous paragraph. By the end of the current financial year five additional Dreadnoughts will be completed for the British Navy, while it is only in the spring of this year that the First Squadron of the German Battle Fleet will be composed entirely of Dreadnoughts.

The shifting of the base of the Fourth or Mediterranean Squadron of the First Fleet from Malta to Gibraltar does not, it is to be hoped, imply a withdrawal from the Mediterranean. If it does, it is the most questionable feature in the scheme. The policy of concentration may be carried too far.

The table below has been prepared to show the present and proposed organisation of the British and German Fleets, and the possible advance towards realisation a year hence.

—	Great Britain.												Germany.		
	First Fleet.					Second Fleet.			Third Fleet.			Grand Total.	Battle Fleet.	Reserve.	Grand Total.
	1st Sq.	2nd Sq.	3rd Sq.	4th Sq.	Total.	1st Sq.	2nd Sq.	Total.	1st Sq.	2nd Sq.	Total.				
Proposed . .	8	8	8	8	33*	8	8	16	8	—	8	57	25	8?	33
Actual . . .	8	8	6	6	28	8	1	9	8	2	10	47	17	8	25
March, 1913 .	8	8	8	6	31*	8	3	11	8	7?	15?	57	21	8	29

* Including Fleet Flagship.

By March 31st, 1913, the First and Second Squadrons will be composed entirely of Dreadnoughts, and there will be one Dreadnought to spare as Fleet Flagship, if the anticipation of the Estimates are

realised. The Agamemnon and Lord Nelson will be available for bringing up the strength of the Third or Atlantic Squadron to eight battleships. The First Squadron of the Second Fleet may be composed entirely of the King Edward class. Two Formidables and one Duncan class will be available for the Second Squadron of this Fleet. Six Canopus class, and nine Majestics, which are as powerful as the ships in the German Reserve Squadron, will be left to complete the Second Squadron of the Second Fleet or to form the Third Fleet.

By March, 1913, four additional battleships, including the Oldenburg, should be completed for Germany. The First Squadron and half the Second Squadron may then be composed of Dreadnoughts; and four battleships of the Deutschland or Braunschweig classes will become available for the Third Squadron.

COMPARATIVE TABLES.

Few changes have been made in the Comparative Tables this year. The German Wittelsbach class, which carry only 9·4 in. guns as their main armament, have been transferred from Table I. to Table III. No battleships, with the exception of the ill-fated Liberté, disappear from the lists. In the cruiser tables, the later German cruisers, built and building, have been placed in the second-class. In displacement and armament they are the equivalents of the Bristol class. Eleven of the small French third-class cruisers, which were indicated last year as probably to be condemned as ineffective, have been struck off the lists.

The present position as regards battleships of all classes is shown in the following table. Only the battleships which are believed to be completed by March 31st, 1912, are reckoned as built. The Thunderer and Lion, which have been through their trials, and will probably be completed in May, the German Oldenburg and the Japanese Kawachi and Settsu, which it has been reported will be completed in April, are shown as building. Ships (viz., the German Ersatz Brandenburg, and the French A 5, 6 and 7) which will probably be laid down early in the year 1912–13 are included as building. Battleships. All classes.

	Britain.	Germany.	U.S.	France.	Russia.	Italy.	Austria.	Japan.
Built . .	56	29	31	21	10	8	6	13
Building .	16	14	6	7	7	6	4	7
Total .	72	43	37	28	17	14	10	20

In completed battleships we are nearly equal to Germany and the United States combined, but we have only two more ships under

construction than Germany alone. France and Russia have much improved their position since last year, when they had respectively sixteen and seven battleships completed. They have now twenty-one and ten completed, but while in numbers the Franco-Russian Fleet is equal to that of Germany, only two of the Russian battleships are fit to lie in a line with Dreadnoughts, and six battleships are now confined to the Black Sea.

Modern battle-ships.

In the following table is given a forecast of the relative positions of the principal navies at the end of 1912 and two following years—the comparison being confined to modern battleships, viz., those included in Table I.

	BRITAIN.	GERMANY.	UNITED STATES.	FRANCE.
1911 (end)	36	17	22	12
1912 (to be completed) .	3	3	2	—
1912 (end)	39	20	24	12
1913 (to be completed) .	4	3	2	2
1913 (end)	43	23	26	14
1914 (to be completed) .	4	3	2	2
1914 (end)	47	26	28	16

In the above figures no allowance has been made for the battleships which may have to be transferred to the category of "older battleships" during the next three years. The Formidable class, the oldest ships in the British list, are certainly fit to lie in a line against the German Deutschlands or Braunschweigs, and the only reason for transferring the former to the lower category is on account of age. In any case the British figures are bound to suffer in future comparisons with those of other navies, because we have many more ships which must be relegated to Table III. or struck off the lists owing to obsolescence.

Cruiser-battle-ships.

Of battle-cruisers or cruiser-battleships we have four (excluding the Lion) completed and six (including the Australia) under construction. Germany has two built and four under construction. while Japan is also building four. The latest ships of this type are more than 10,000 tons larger than the Indomitables, and it may well be questioned whether it is good policy to put so many eggs in one basket. For the fighting line the battleship is more serviceable, while the protection of commerce would be better provided for by distributing the cost of the Lion between two or three ships.

Dread-noughts.

The comparison of naval strength is confined to Dreadnoughts by those who consider that the ship armed with eight or ten guns of

11-in. calibre or over has put all the older ships out of the reckoning. Though this view has never been accepted in these pages, the accompanying table has been prepared to show the number of Dreadnoughts and ships fit to lie in a line with them which will be completed on March 31st, 1912, and the three following years. It has been assumed that the four armoured ships to be laid down in 1912–13 for the British Navy will be battleships.

	BRITAIN.	GERMANY.	U.S.	FRANCE.	RUSSIA.	AUSTRIA.	ITALY.	JAPAN.
1912	14	7	6	6	2	—	1	2
1913	19	11	8	6	2	1	3	4
1914	24	13	10	8	6	2	4	4
1915	28	16	12	10	9	4	6	5

The following table is a forecast of the position as regards battle-cruisers :— Battle-cruisers.

		BRITAIN.	GERMANY.	JAPAN.
1912	...	4	2	—
1913	...	9	3	—
1914	...	10	4	1
1915	...	10	5	4

In preparing the above forecasts it has been estimated that British ships will be completed as they are now in about two years; that the German programme of construction as set forth in the Estimates will be adhered to, and that the period of construction in Germany is about three years. Germany does occasionally complete her battleships in somewhat less, and could probably complete the hulls of several ships at once in two years. It is however doubtful whether the supply of guns, gun mountings, and other fittings could keep pace with this rate of construction. We have a great advantage over Germany in respect of the number of first-class firms which can not only build the hulls of warships but complete the ships in every respect. In France and Russia the period of construction of a battleship will probably be reduced to three years or a little over. In Italy the rate of construction is also being improved. The forecast is probably fairly accurate; and though the German Navy may somewhat improve its relative position during the next two years, we shall, by March 31st, 1914, have twenty-four Dreadnoughts and Germany thirteen. Adding the battle-cruisers, which are often classed as Dreadnoughts, we shall have in 1914 thirty-four all-big-gun ships to Germany's seventeen. The position will not be unsatisfactory, but having regard to the fact that Austria has four battleships of the largest class under construction there can be no reduction in our battleship programme. A noteworthy feature of the table is the

great improvement which will take place in the position of France and Russia after 1913. In 1914 the Franco-Russian Alliance will have fourteen all-big-gun battleships. Germany alone will have thirteen, and the Triple Alliance nineteen. In 1915 the Franco-Russian position will still further improve. France and Russia will have nineteen ships, Germany sixteen, and the Triple Alliance twenty-six.

In the cruiser classes we have a large superiority, but hardly so great as is required for the protection of the enormous interests we have at stake on the sea. Of first-class cruisers we have 41, Germany 9, France and the United States each 15. In this class France and the United States stand well. Of second-class cruisers, built and building, we have 42, Germany 14, and France 11; and of the third-class we have 34, Germany 30, and France 10 after striking off ineffective ships. In this class we do not stand well. Most of the German third-class cruisers are more modern and faster than ours, but they carry a very poor armament, and could hardly fight the Naval Defence Act cruisers of the Latona class. For the protection of commerce more second-class cruisers are required.

The British programme of new construction for 1912–13 comprises four armoured ships. This programme may be regarded as adequate provided that we maintain our present advantage over Germany in rapidity of construction, completing our ships in two years, and that there is no acceleration in the German rate. The supplementary programme proposed for the German Navy will not affect the figures of completed battleships in the forecasts given above.

The survey of comparative strength made in the foregoing pages leads to the conclusion that the position, whether as regards Fleets in commission or programmes of construction, is not unsatisfactory from the British point of view. The German menace has been frankly and squarely met by the First Lord. The only serious criticism which the present writer would venture to make is that the policy of concentration may be carried too far. We have possessions in every sea, and we still possess nearly half the mercantile tonnage of the world.

HYTHE.

TABLE I.—MODERN BATTLESHIPS.

GREAT BRITAIN.

Launched.	Name.	Displacement. (tons.)
	Iron Duke	‡
	Marlborough	25,000
	Delhi	
	Benbow	
1911	*King George V.*	
1912	*Ajax*	21,000
	Audacious	
1911	*Centurion*	
1911	*Conqueror*	
1911	Monarch	
1911	*Thunderer*	22,500
1910	Orion	
1910	Colossus	
1910	Hercules	20,000
1909	Neptune	19,900
1908	Collingwood	
1908	St. Vincent	19,250
1909	Vanguard	
1907	Bellerophon	
1907	Temeraire	18,600
1907	Superb	
1906	Dreadnought	17,900
1906	Lord Nelson	
1906	Agamemnon	16,500
1903	Edward VII.	
1903	Commonwealth	
1903	Dominion	
1903	Hindustan	16,350
1904	New Zealand	
1905	Africa	
1904	Britannia	
1905	Hibernia	
1903	Swiftsure	
1903	Triumph	11,800
1902	Queen	
1902	Prince of Wales	15,000
1901	Albemarle	
1901	Cornwallis	
1901	Duncan	14,000
1901	Exmouth	
1901	Russell	
1898	Formidable	
1898	Irresistible	
1899	Implacable	
1899	London	15,000
1899	Venerable	
1899	Bulwark	
	47 ships.*	854,750

GERMANY.

Launched.	Name	Displacement. (tons.)
	Ers Brandenburg	
	Ers Weissenburg	
	Ers K. F. Wilhelm	
	S.	
1911	*Kaiserin*	
	König Albert	
1912	*Prinz Luitpold*	24,100
1911	*Friedrich der Grosse*	
1911	*Kaiser*	
1910	*Oldenburg*	
1909	Thüringen	
1909	Ostfriesland	22,500
1909	Helgoland	
1908	Posen	
1908	Rheinland	18,200
1908	Nassau	
1908	Westfalen	
1904	Deutschland	
1905	Hannover	
1905	Pommern	13,040
1906	Schlesien	
1906	Schleswig-Holstein	
1902	Braunschweig	
1903	Elsass	
1903	Hessen	12,997
1903	Preussen	
1904	Lothringen	
	27 ships.	† 566,185

UNITED STATES.

Launched.	Name.	Displacement. (tons.)
	Nevada	28,000
	Oklahoma	
	New York	27,000
	Texas	
1911	*Wyoming*	26,000
1911	*Arkansas*	
1910	Florida	21,825
1909	Utah	
1909	Delaware	20,000
1908	North Dakota	
1908	Michigan	16,000
1908	South Carolina	
1905	Idaho	13,000
1905	Mississippi	
1904	Connecticut	
1905	Kansas	
1904	Louisiana	
1905	Minnesota	16,000
1906	New Hampshire	
1905	Vermont	
904	Georgia	
1904	Nebraska	
1904	New Jersey	14,948
1904	Rhode Island	
1904	Virginia	
1901	Ohio	12,440
1901	Maine	
1901	Missouri	12,300
	28 ships.	511,430

FRANCE.

Launched.	Name.	Displacement. (tons.)
	A 5	
	A 6	22,637
	A 7	
	France	
	Paris	23,100
1911	*Courbet*	
1911	*Jean Bart*	
1909	Danton	
1909	Condorcet	
1909	Diderot	
1909	Mirabeau	18,028
1910	Vergniaud	
1909	Voltaire	
1903	Patrie	
1902	République	
1904	Justice	14,635
1907	Vérité	
1904	Démocratie	
1899	Suffren	12,527
	19 ships.	357,007

JAPAN.

Launched.	Name.	Displacement. (tons.)
	Fuso	30,000
1910	*Kawachi*	20,800
1911	*Settsu*	
1907	Aki	19,800
1906	Satsuma	19,350
1905	Kashima	16,400
1905	Katori	15,950
1902	Iwami	13,516
1900	Hizen	12,700
1899	Asahi	15,200
1900	Mikasa	
1898	Shikishima	14,850
	12 ships.	214,566

RUSSIA.

Launched.	Name.	Displacement. (tons.)
	Ekaterina II.§	
	Alexander III.§	22,500
	Imperatritsa§ *Maria*	
1911	*Sevastopol*	
1911	*Petropavlosk*	§ 23,000
1911	*Gangut*	
1911	*Poltava*	
1907	Imperator Pavel I.	
1906	Andrei Pervozvannyi	17,200
1906	Ioann Zlatoust§	
1906	Evstafi	12,733
1903	Slava	13,516
1901	Cesarevitch	12,912
1900	Panteleimon	12,480
	11 ships.	258,274

ITALY.

Launched.	Name.	Displacement. (tons.)
	Doria	21,000
	Duilio	
1911	*Conte di Cavour*	
1911	*Giulio Cesare*	21,500
1911	*Leonardo da Vinci*	
1910	*Dante Alighieri*	18,300
1904	Regina Elena	
1904	Emanuele III.	
1907	Roma	12,425
1905	Napoli	
1901	Ra Margherita	13,214
1901	Benedetto Brin	
	12 ships.	200,928

* Four projected. † 100,000 added for new ships. ‡ Doubtful. § Black Sea.

Table II.—Battle-Cruisers.

GREAT BRITAIN.			GERMANY.			JAPAN.		
Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.
		tons.			tons.			tons.
	Tiger	28,000†		*Ers. Kaiserin Augusta* ...			*Kongo*	
1912	*Queen Mary* ...	27,000		*K.*			*Haruna*	27,500 †
1911	*Princess Royal*	26,350	1912	*Seydlitz*			*Hiyei*	
1910	*Lion*		1911	*Goeben*	22,600		*Kisishima* ...	
1911	*New Zealand* ...	18,800	1910	Moltke				
1911	*Australia** ...		1909	Von der Tann...	18,700			
1909	Indefatigable ...	18,750						
1907	Indomitable ...							
1907	Inflexible	17,250						
1907	Invincible							
	10 ships.	198,550		6 ships.			4 ships.	110,000

* Australian Navy. † Doubtful.

Table III.—Older Battleships.

GREAT BRITAIN.			GERMANY.			UNITED STATES.		
Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.
		tons.			tons.			tons.
1897	Canopus		1900	Wittelsbach ...		1898	Wisconsin ...	11,653
1899	Glory		1901	Wettin		1898	Alabama	11,565
1898	Albion	12,950	901	Zahringen ...	11,643	1898	Illinois	
1898	Goliath		901	Mecklenburg ...		1898	Kearsarge... ...	11,540
1898	Ocean		1901	Schwaben... ...		1898	Kentucky... ...	
1899	Vengeance ...		1896	Kaiser Friedrich III.		1896	Iowa	11,340
1894	Magnificent ...		1897	Kaiser Wilhelm II		1893	Indiana	
1895	Majestic		1899	Kaiser Wilhelm der Grosse ...	10,974	1893	Massachusetts...	10,288
1895	Prince George ...		1900	Kaiser Barbarossa		1893	Oregon	
1895	Victorious ...		1899	Kaiser Karl der Grosse				
1896	Cæsar	14,900						
1896	Hannibal							
1896	Illustrious ...							
1895	Jupiter							
1896	Mars							
	15 ships.	215,800		10 ships.	113,085		9 ships.	100,067

FRANCE.			JAPAN.			RUSSIA.			ITALY.		
Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.
		tons.			tons.			tons.			tons.
1896	Bouvet	12,007	1898	Sagami	12,674	1893	Tria Sviatitelia	13,318	1897	E. Filiberto ...	9,645
1895	Masséna	11,735	1900	Suo		1892	Georgi Pobiedonosetz	10,280	1897	Saint Bon... ...	
1896	St. Louis	11,090	1896	Fuji	12,320	1896	Rostislav	8,880			
1896	Gaulois	11,105	1894	Tango	10,960						
1895	Charlemagne ...	11,108									
1893	Jauréguiberry...	11,637									
1893	Charles Martel	11,693									
1894	Carnot	11,954									
1899	Henri IV. ...	8,807									
	9 ships.	101,136		4 ships.	48,628		3 ships.	42,758		2 ships.	19,290

Table III.—First-Class Cruisers.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts		tons.
22¼	Minotaur... ...	
22¼	Shannon... ...	14,600
22¼	Defence	
23	Duke of Edinburgh	
23	Black Prince ...	13,550
23	Achilles	
23	Cochrane	
23	Natal	
23	Warrior	
22¼	Devonshire ...	
22¼	Antrim	
22¼	Argyll	10,850
22¼	Carnarvon ...	
22¼	Hampshire ...	
22¼	Roxburgh ...	
23	Monmouth ...	
23	Kent...	
23	Essex	
23	Berwick	
23	Cornwall	9,800
23	Cumberland ...	
23	Donegal	
23	Lancaster ...	
23	Suffolk	
23	Drake	
23	Good Hope ...	14,100
23	King Alfred ...	
23	Leviathan ...	
21	Aboukir	
21	Bacchante ...	
21	Cressy	12,000
21	Euryalus	
21	Hogue	
21	Sutlej	
20¼	Amphitrite* ...	
20¼	Argonaut* ...	11,000
20¼	Ariadne*	
20¼	Spartiate*... ...	
20¼	Andromeda* ...	
20¼	Diadem*	11,000
20¼	Europa*	
	41 ships.	483,800

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
23	Blücher	15,253
22¼	Scharnhorst ...	11,420
22¼	Gneisenau ...	
21	Roon...	9,350
21	Yorck	
20¼	Prinz Adalbert	8,858
20¼	Friedrich Karl...	
20¼	Prinz Heinrich	8,759
19	Fürst Bismarck	10,570
	9 ships.	93,838

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
22	Washington ...	
22	Tennessee ...	14,500
22	Montana	
22	North Carolina	
22	St. Louis	
22	Charleston ..	9,700
22	Milwaukee ...	
22	West Virginia	
22	California ...	
22	Colorado	13,680
22	Maryland... ...	
22	Pennsylvania ...	
22	South Dakota ...	
21	Manhattan ...	8,200
21	Brooklyn	9,215
	15 ships.	186,595

FRANCE.

Speed.	Name.	Displacement.
kts		tons.
23	Edgard Quinet	
23	Waldeck-Rousseau ...	13,780
23	Ernest Renan...	13,427
23	Jules Michelet	12,370
22	Léon Gambetta	
22	Jules Ferry ...	12,351
22	Victor Hugo ...	
21	Condé	
21	Gloire	9,856
21	Marseillaise ...	
21	Amiral Aube ...	
21	Gueydon	
21	Montcalm ..	9,367
21	Dupetit Thouars	
21	Jeanne d'Arc...	11,092
	15 ships.	169,027

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
21	Ikoma	13,750
21	Tsukuba	
22	Ibuki	14,620
22	Kurama	
21	Aso	7,726
20	Kasuga	7,700
20	Nisshin	
21	Idzumo	9,750
21	Iwate	
20	Yakumo	9,850
21	Adzuma	9,436
21¼	Asama	9,700
21¼	Tokiwa	
	13 ships.	138,052

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
21	Rurik	15,170
22	Adm. Makaroff	
21	Bayan	7,900
21	Pallada	
20	Gromoboi	12,336
20	Rossia	12,130
	6 ships.	63,336

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
22¼	Amalfi	
22¼	Pisa	9,832
22¼	San Giorgio ...	
22¼	San Marco ...	
20	Giuseppe Garibaldi	7,294
20	Varese	
20	F. Ferruccio ...	
	7 ships.	61,210

* Protected Cruisers.

Table IV.—Second-Class Cruisers.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
	Birmingham	
	Lowestoft	
	Nottingham	
	*Brisbane** ...	
25½	*Chatham*	
25½	*Dublin*	
25½	*Southampton* ...	5,400
25½	*Melbourne** ..	
25½	*Sydney** ...	
24¾	Dartmouth ...	
24¾	Falmouth... ...	5,250
24¾	Weymouth ...	
24¾	Yarmouth ...	
25	Bristol	
25	Glasgow	
25	Gloucester ...	4,800
25	Liverpool... ...	
25	Newcastle ...	
19¾	Crescent	7,700
20	Edgar	7,350
20	Endymion ...	7,350
19¾	Gibraltar	7,700
20	Grafton	7,350
20	Hawke	7,350
19¾	Royal Arthur ...	7,700
20	Theseus	7,350
19½	Diana	
19½	Dido	
19½	Doris...	
19½	Eclipse	
19½	Isis	5,600
19½	Juno	
19½	Minerva	
19½	Talbot	
19½	Venus	
19	Furious	5,750
19	Vindictive ...	
20	Hermes	
20	Highflyer... ...	5,600
20	Hyacinth	
21	Challenger ...	5,880
21	Encounter ...	
	42 ships.	227,710

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
26	*Ers. Irene* ...	
26	*Ers. Prinzess Wilhelm* ...	5,000†
26	*Ers. Geier* ...	
26	*Ers. Seeadler* ...	
26	*Stralsund* ...	
26	*Strasburg* ...	4,500†
25½	Breslau	
25½	Magdeburg ...	
21	Kaiserin Augusta	5,956
19½	Freya	
19½	Hertha	5,569
19½	Victoria Luise	
19½	Hansa	5,791
19½	Vineta	
	14 ships.	72,245

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
22·8	Columbia	7,375
23	Minneapolis ...	
21¾	Olympia	5,870
	3 ships.	20,620

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
21	Desaix	
21	Dupleix	7,578
21½	Kléber	
19	D'Entrecasteaux	7,995
23	Guichen	8,151
23	Châteaurenault	7,898
18	Bruix	4,735
18	Charner	4,702
18	Latouche-Tréville	4,681
19	Pothuau	5,374
23	Jurien de la Gravière ...	5,595
	11 ships.	71,865

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
26	*Hirado*	
26	*Shikuma*	4,800
26	*Yahagi*	
22½	Chitose	4,760
22½	Kasagi	5,416
23	Soya	6,500
20	Tsugaru	6,630
	7 ships.	37,706

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
18	Pamyat Azova	6,734
20	Aurora	6,731
20	Diana	6,630
23	Askold	5,905
23	Bogatyr	
23	Kagul	6,645
23	Otchakoff... ...	
23	Oleg	6,675
	8 ships.	52,610

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
20	Carlo Alberto ...	6,396
20	Vettor Pisani ...	
19	Marco Polo ...	4,511
	3 ships.	17,303

* Australian Navy. † Doubtful.

TABLE V.—THIRD-CLASS CRUISERS.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
25	*Fearless*	
25	Active	3,440
25	*Amphion*	
25	Blonde	
25	Blanche	3,350
25	Bellona	
25	Boadicea	3,300
23	Amethyst... ...	
22	Diamond	
22	Sapphire	3,000
22	Topaze	
19½	Astræa	
19½	Cambrian... ...	
19¾	Charybdis ...	
19¾	Flora...	4,360
19¾	Forte...	
19½	Fox	
19¾	Hermione... ...	
19¾	Æolus	3,600
19¾	Brilliant	
19¾	Melpomene ...	3,400
20	Sappho	
20	Scylla	
19¾	Sirius	3,600
19	Philomel	2,575
20½	Pelorus	
20	Proserpine ...	
20	Pegasus	2,135
20	Perseus	
20	Prometheus ...	
20	Pyramus	
20	Pandora	
20	Pioneer	2,200
20	Psyche	
	34 ships.*	105,735

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
27	Augsburg ...	4,280
27	Köln...	
25½	Kolberg	4,234
25½	Mainz	
24½	Emden	3,544
24½	Dresden	
23½	Stuttgart... ...	
23½	Nürnberg... ...	3,396
23½	Stettin	
23	Königsberg ...	3,346
23	Bremen	
23	Hamburg ...	
23	Berlin	
23	Munchen	3,200
23	Lubeck	
23	Leipzig	
23	Danzig	
21½	Frauenlob ...	
21½	Arcona	2,657
21½	Undine	
21	Medusa	
21	Nymphe	
21	Amazone	2,618
21	Ariadne	
21½	Thetis	
21	Gazelle	2 603
21	Niobe	
20	Gefion	3,712
20	Irene...	4,233
19	Prinzess Wilheim ...	
	30 ships.	98,495

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
24	Birmingham ...	
24	Chester	3,750
24	Salem	
18½	Detroit	
18½	Marblehead ...	2,089
18½	Montgomery ...	
20	Albany	3,487
20	New Orleans ...	
20	Baltimore... ...	4,413
18	Chicago	5,273
19	Newark	4,098
19½	San Francisco...	
19	Cincinnati ...	3,213
19	Raleigh	
	14 ships	48,799

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
20	Lavoisier	2,285
20½	D'Estrées... ...	2,421
19	Alger	4,313
19½	Friant	3,882
19	Descartes	3,970
19	Cassard	3,890
19	Du Chayla ...	3,890
20½	Cosmao	1,923
20½	Forbin	1,935
20½	Surcouf	2,012
	10 ships.	30,521

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
23	Tone	4,035
20	Akashi	2,657
20	Suma	
19	Akitsushima ...	3,150
17	Chiyoda	2,450
17	Hashidate ...	4,277
17	Itsukushima ...	
18½	Naniwa	3,700
18½	Takachiho ...	
20	Niitaka	3,365
20	Tsushima... ...	
20	Otawa	3,000
25	Sutsuya	3,080
	13 ships.	43,713

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
19	Almaz	3,285
23	Jemtchug ...	3,106
	2 ships.	6,391

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
29	*Quarto*	
29	*Marsala*	3,400
29	*Nino Bixio* ...	
18	Etna	3,470
17½	Fieramosca ...	3,534
17	Stromboli... ...	3,836
21	Piemonte	2,597
17	Calabria	2,428
18	Elba	2,690
17½	Giovanni Bausan	3,277
19	Etruria	
18	Liguria	2,245
18	Umbria	
17	Lombardia ...	2,351
20	Puglia	2,498
	15 ships	43,616

* Eight projected.

Effective Fighting Ships, Built and Building.

Class.	Great Britain.			Germany.			United States.			France.			Japan.			Russia.			Italy.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships:—																					
Modern ...	37	10	47	17	10	27	22	6	28	12	7	19	9	3	12	7	7	14	6	6	12
Cruiser ...	4	6	10	2	4	6	—	—	—	—	—	—	—	4	4	—	—	—	—	—	—
Older... ...	15	—	15	10	—	10	9	—	9	9	—	9	4	—	4	3	—	3	2	—	2
Total ...	56	16	72	29	14	43	31	6	37	21	7	28	13	7	20	10	7	17	8	6	14
Cruisers:—																					
1st Class ...	41	—	41	9	—	9	15	—	15	15	—	15	13	—	13	6	—	6	7	—	7
2nd Class ...	33	9	42	8	6	14	3	—	3	11	—	11	4	3	7	8	—	8	3	—	3
3rd Class ...	32	2	34	30	—	30	14	—	14	10	—	10	13	—	13	2	—	2	12	3	15
Total ...	106	11	117	47	6	53	32	—	32	36	—	36	30	3	33	16	—	16	22	3	25

TORPEDO FLOTILLAS.

Class.	Great Britain.			Germany.			United States.			France.			Japan.			Russia.			Italy.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
DESTROYERS ..	179	31	210*	117	12	129‡	36	13	49	72	13	85	59	2	61	94	9	103	28	13	41
TORPEDO BOATS† 1st & 2nd Class	58	—	58	47	—	47	32	—	32	185	—	185	48	—	48	24	1	25	46	32	78
SUBMARINE BOATS	66	13	79	16	12**	28	22	13	35	72	11§	83	14	3	17	41	10	51	11	9	20

* 20 projected. † Excluding boats over 20 years old. ‡ 12 to be built 1912. ** Uncertain. § 9 to be built 1912.

Total Naval Expenditure.

	Great Britain.	Germany.	United States.	France.	Japan.	Russia.	Italy.
	£	£	£	£	£	£	£
1903	35,709,477	10,401,174	16,824,058	12,292,227	3,611,786	12,349,567	4,840,000
1904	36,859,681	10,102,740	20,180,310	12,382,433	2,061,322	11,949,906	5,000,000
1905	33,151,841	11,301,370	24,444,948	12,667,856	2,341,194	12,392,684	5,040,000
1906	31,472,087	12,005,871	21,358,199	12,245,740	6,187,667	12,490,444	5,322,154
1907	31,251,156	14,225,000	21,260,732	12,486,793	7,227,232	8,850,240	5,661,822
1908	32,181,309	16,490,000	26,438,434	12,797,308	8,094,884	10,222,733	6,266,193
1909	35,831,800	19,702,685	28,990,592	13,353,824	7,202,823	9,895,641	6,537,118
1910	40,603,700	21,235,090	27,001,866	15,023,019	7,608,081	9,723,574	7,458,426†
1911	44,392,500	21,095,932	25,989,498	16,654,621	8,861,829†	11,502,306	7,808,608
1912	44,085,400	22,008,746	25,944,798	16,931,149	9,461,817	17,447,950*	8,675,444

* Excludes Supplementary Estimate for Black Sea.
† Includes Supplementary Estimate.

Amount Voted for New Construction.

The Actual Expenditure for Great Britain is shown in Italics.

	Great Britain.	Germany.	U. States.	France.	Japan.	Russia.	Italy.
	£	£	£	£	£	£	£
1903	11,473,030 (*12,398,133*)	4,388,748	5,327,367	4,528,621	—	3,268,755	1,183,338
1904	13,508,176 (*13,184,419*)	4,275,489	6,611,909	4,370,102	—	4,480,188	1,121,753
1905	11,291,002 (*11,368,744*)	4,720,206	8,683,000	4,705,295	—	4,576,370	1,714,556
1906	10,859,500 (*10,486,397*)	5,167,319	6,776,086	4,652,010	752,595	4,576,583	1,362,207
1907	9,227,000 (*8,849,589*)	5,910,959	4,872,888	4,138,967	3,233,298	2,846,268	1,398,111
1908	8,660,202 (*8,521,930*)	7,795,499	6,227,874	4,193,544	2,967,918	2,703,721	1,866,358
1909	11,227,194* (*11,052,318*)	10,177,062	7,976,897	4,517,766	2,345,572	1,758,487	2,190,707
1910	13,279,830	11,392,856	6,889,005	4,977,682	2,692,260	1,424,013	2,181,200‡
1911	15,063,877	12,250,269	5,343,782	5,767,537	2,977,493	4,609,444	2,277,302‡
1912	13,971,527	11,787,565	4,998,140	5,275,146	—	7,616,850†	2,400,000‡

* Includes Supplementary Estimate, £689,100.
† Not including £1,221,875 for Black Sea.
‡ Should be increased by sum available under Law of 1911.

CHAPTER V.

Machinery Problems in High-Powered Warships.

The problems to be solved by the designer and constructor of machinery for warships have increased in difficulty, while their solution has become more imperative, by the demand for higher speeds in ships together with great fighting force. A few years ago the strategist and tactician considered 19 knots a sufficiently high rate of speed for ships of the line. Now they ask for 27 or 28 knots, and more, for ships with the same, or much greater, power of attack, and with almost the same thickness, and equal extent, of armour protection. Such battle-cruisers require so much power to drive them at the high speeds desired that the weight of their propelling machinery may now, or will soon, reach 5600 tons. In other words, one-fifth of the total displacement is taken up with machinery. Although this proportion is only equal to that usually allowed for armaments, the artillerist is jealous of the increase, and, as ever, seeks to impose limitations to the weight of machinery while still exacting the high speed. In Germany and some other continental countries the combatant officers have been more successful than in this country in the enforcement of reduced weights for propelling machinery; and it is pertinent to inquire whether the result is altogether satisfactory, and to what extent the compliance with such demands is commendable for British ships.

Weight of battle-cruisers' machinery.

As a first and indisputable proposition it may be said that naval engine designers are always anxious to economise in weight and to attain efficiency. In Britain reliability in prolonged high-speed steaming has been recognised as of primary, and economy and weight as of secondary, importance. If advance is to be made a certain measure of risk must be taken, and in naval engineering it is taken. Courage reaps its reward when all goes right, but no excuse is made for failure. When ships go into action the continuous maintenance of a speed of even only a mile per hour faster than that of the enemy may mean everything. Thus high-speed trials of short duration are not the truest test, nor are their results trustworthy bases for deductions when the ship does not carry her service load. Both these conditions obtained when the German cruiser Moltke attained her

Conditions of speed trials of battle-cruisers.

much advertised rate of 29½ knots. Her measured mile trials gave a speed of 28·4 knots, with her turbines making 325 revolutions and developing about 86,000 shaft-horse-power, while on a separate six hours' trial at full power the speed was 27·25 knots, with an average of 76,680 shaft-horse-power. The Von der Tann, about which also misstatements have been made, got 27·63 knots for 71,500 shaft-horse-power. The "log" speed of 31½ knots credited by the Press to the Lion is probably as much above the actual rate got on measured mile trials as the Moltke's 29½ knots exceeded her 28·4 knots. British trial conditions are certainly severe and are directed to test reliability rather than to conduce to the realisation of very high speeds for short periods of time.

Choice of types of boilers.

In considering, in the light of practice in various countries, whether a happy mean has been struck in the present day solution of some of the machinery problems, the boilers call for first attention. British practice, up to within a year or so, has been influenced by the limitation imposed upon the rate of fuel combustion per foot of heating surface, in order to ensure greater durability and the maintenance of high speed for long periods, and further by the aim to get high economy at cruising speeds. The German engineer, on the other hand, primarily considers how much fuel can be burned for the minimum of weight, without burning the boilers, the amount of steam available being the determining factor as to the power developed in the turbines, and as to the speed realised by the ship. This leads to the consideration of the question whether the large-tube or the small-tube boiler should be fitted, the Germans adopting the latter and the British the former. Non-technical authorities—and many such influence decisions on technical questions at all Admiralties—seemed, in the early stages of the water-tube boiler, to believe that large tubes were suited for large ships and small tubes for small ships, alliteration evidently having been a guiding influence. This view is changing. It is not easy to understand why a boiler with small tubes should not work as well in a big ship as in a small ship. The Russians have a saying that the boiler does not know the size or the type of the ship in which it is embarking.

Large-tube *versus* small-tube boilers.

To make the arguments quite clear to the lay reader, it should be said that in large-tube boilers—perhaps it would be more accurate to say horizontal tube boilers—such as the Babcock & Wilcox, Belleville, Niclausse, Miyabara, and others, the tubes, in which steam is generated, are more or less approximately horizontal, and range from 1¾ in. up to 4 in. in outside diameter, the fire grate being placed under them. The small-tube or "Express" boiler, of which the Thornycroft, Yarrow, Normand

and Schultz types are the best known, is triangular in section, with water drums at the ends of the base line and a steam drum at the apex, the steam generating tubes, extending from the bottom to the top drums, varying as a rule from 1 in. to $1\frac{1}{2}$ in. in external diameter, with the fire grate between the water drums. The Yarrow boiler is, however, made also with $1\frac{3}{4}$-in. tubes, and is then regarded in all navies as suitable for big ships.

Weight.

The small-tube boiler weighs less per square foot of heating surface, which is the determining factor in the generation of steam; in the small-tube boiler the weight is 14lb. to 15lb. and in the other 23lb. to 24lb., including boilers, water and fittings. Thus in adopting the small-tube "Express" boiler in their battle-cruisers, the Germans probably save quite 450 tons on the boiler weights.

Rate of consumption.

German cruisers' trials are run with an air pressure in the stokehold of quite 3 in., and under those conditions the boilers burn 60lb. of coal per square foot of grate per hour. In British practice the air pressure is seldom over 1 in. and the rate of combustion rarely reaches 50lb. with $1\frac{3}{4}$-in. tube boilers and 30lb. to 35lb. with the combined $1\frac{3}{4}$-in. and 4-in. tube boilers. The former has more heating surface relative to grate area than the latter, and thus the coal consumption is 0·85lb. and 0·9lb. respectively per square foot of heating surface. With greater experience there is now less tendency in Britain to limit the rate of consumption per square foot of heating surface.

Durability.

It is contended that the small-tube boiler is less durable, but this is largely a matter of care in management. Durability depends greatly upon the keeping of the surfaces cleaned, which in turn depends upon the facility afforded for examination. There should therefore be ready access to the interior of the tubes for inspection and cleaning. The experienced engineer can arrive at a conclusion as to the merits of the respective types by applying this general standard. There are those who consider that there is greater tendency to priming in the small-tube boiler should the water become slightly "salted," owing to condenser troubles, to priming of evaporators, or to salt water getting into the reserve tanks. These contingencies are more liable to occur, and more difficult to rectify, in a large installation than in a small one—for instance, in destroyers or small cruisers. The larger diameter tubes are of thicker metal—$\frac{1}{4}$ in. in the case of 4-in. tubes, against $\frac{1}{8}$ in. in $1\frac{3}{4}$-in. and $1\frac{1}{4}$-in. tubes. But strength does not depend altogether on thickness of metal. The metal of the tubes of the boiler of the famous Turbinia was only $\frac{1}{16}$-in. thick, and no boiler has ever had to stand the degree of pressing to which it was

subjected, and yet the tubes were not seriously affected. It should be stated, however, that the high-pressure runs were for relatively short periods of time. Indeed, it is easier to overheat a thick metal than a thin one; although if corrosion be permitted, the small, thin tube must suffer sooner. That is a matter for care—to ensure that when emptied the tubes are dry. The greater angle of inclination of the tubes in the small-tube boiler conduces to this dryness. Again, the smaller the tube the less the destruction or danger to life should one burst. The flow of water out of the opening then is so much less than in the case of a large tube that the water level does not fall so quickly and longer time is afforded for drawing or extinguishing the fire in order to obviate serious damage to the boiler, through the water level dropping too low. A satisfactory ratio of length to diameter must however be maintained to give a flow of water adequate to ensure that the interior surface is covered with water, otherwise burning will ensue. This ratio may be 8 ft. 6 in. of length to $1\frac{1}{4}$ in. outside diameter without risk. A $1\frac{1}{4}$-in. tube lends itself more readily to speedy repair than the $1\frac{3}{4}$-in. tube, as it does not require so much power to expand it; this is important in view of confined spaces.

Safety.

Types of boilers in foreign high-speed ships.

Reference has been made to the British and German practice in large fast-steaming ships. In the former the large-tube type of boiler is preferred, the Babcock & Wilcox and Yarrow being used. The Babcock & Wilcox boiler is now made with $1\frac{13}{16}$-in. diameter tubes, except the row next the fire, which is of 4 in. diameter tubes; while in the Yarrow boiler the tubes are $1\frac{3}{4}$-in. throughout. In the German Navy the small-tube boiler—the Schultz-Thornycroft—is adopted. The Austrians are applying the Yarrow type with $1\frac{3}{4}$-in. tubes, using 3 in. of air pressure and burning 50lb. to 60lb. of coal per sq. ft. of grate per hour, and 1lb. per sq. ft. of heating surface. The French authorities fit the Belleville boiler in large ships; on normal full-power trials they burn up to 26lb. of coal per sq. ft. of grate per hour, but they have a supplementary trial of three hours' duration when the full power must be maintained with only three-fourths of the boilers in use. On this trial they burn 35lb. of coal per square foot of grate area per hour, or 1·15lb. per square foot of heating surface. The Russian Navy has adopted Yarrow type boilers, and these in their new 23,000 ton battleships, recently launched, will consume 38lb. per square foot of grate per hour on a twelve hours' trial at 32,000 shaft-horse-power, but on a four hours' run at 42,000 shaft-horse-power, to give 23 knots speed, when coal and oil will be

used, the rate of fuel consumption is to be 50lb. per square foot of grate, or 0·91b. per square foot of heating surface per hour. The Italian authorities use small-tube boilers in large ships; the San Giorgio burned about 50lb. of coal per square foot of grate per hour. The Japanese authorities in their large cruisers building in Japan are, as stated in Engineer Rear-Admiral Fujii's paper at the Institution of Naval Architects, using a boiler very similar to the Yarrow type but with slightly curved tubes. In their existing large cruisers with Miyabara boilers they burn 44lb. of coal per square foot of grate per hour. In the United States the large-tube boiler is used with a combustion of about 40lb. of coal per square foot of grate per hour with 1 in. of air pressure.

Working boilers under high pressure.

It will be noted that it is the custom to consume a larger amount of coal per sq. ft. of grate in the small ($1\frac{1}{4}$-in.) tube boiler by pressing the boiler more, which is permissible as the limit has not been reached in consumption per sq. ft. of heating surface. By following this practice in German cruisers a saving in weight for a given power is realised. Even large-tube boilers could be pressed more than is the case now. The total amount of coal consumed under high pressure or otherwise is dependent on the size of the grate and on the freedom of circulation in the tubes. In large-tube boilers there is a greater proportion of grate to heating surface than in small-tube boilers, in order to avoid frequent cleaning of the fires, which, in prolonged high-speed steaming, tends to reduce speed, owing to "loss of steam." The floor space occupied is less per unit of grate in the case of large-tube boilers with tubes approaching the horizontal. The side walls are vertical and thin, all the tubes being over the fire. In the triangular or small-tube boilers there are at the sides the water drums with the tubes rising from them to the steam drum at the apex, so that the width of the fire is narrowed, or the extent of floor space occupied increased, by the water drums. The Germans have minimised this disadvantage by increasing the width of the boiler and introducing, equidistant from the ends of the base line, a central water drum, with vertical tubes connecting to the steam drum at the apex and a grate on each side of the central drum. In general practice the ratio of grate to heating surface is, in battle-cruisers with large-tube boilers, 1 to 35; in triangular moderate diameter tube boilers, 1 to 60, and in small-tube boilers, 1 to 58. Two square feet of heating surface should suffice for each horse-power to be developed in practically each type; the difference, in any case, is small. No direct disadvantage from the evaporative point of view follows, therefore, from any restriction of grate in the small-tube boiler. Thus, even if in a cruiser or battleship one does not want to

force the boiler as much as in a torpedo-boat, it is quite legitimate to have small tubes.

Express boilers in destroyers.

Experience with the small-tube boiler in the lighter cruiser and torpedo boat destroyer is bound to influence practice. The small-tube boiler is universally adopted in destroyers, but there are differences in the fuel used. In the British and French navies either coal or oil is used exclusively; both are not used in combination as in large ships. In the United States and Japanese navies oil is used in conjunction with coal in the same boilers. In the German, Austrian and Argentine destroyers some of the boilers are coal-fired only, and these are used when cruising; others are oil-fired, for use only when steaming at full speed. The cheaper fuel is thus adopted during the greater part of the year.

Oil fuel in boilers.

The time is fast approaching when oil will be exclusively adopted for all ships, notwithstanding possible higher cost, estimated at 33 per cent. when allowance is made for the higher evaporative efficiency, This is compensated for by reduced staff and less size of ship, and by the fact that the oil-fired boiler is more efficient than the coal-fired boiler. Even so, this does not much affect the arguments regarding the choice between small tube and large tube boilers. Indeed, the change will be to the advantage of the former. There is no trouble from grates choking up as under severe pressing with coal. The vessel may continue at full speed for a period as long as the fuel lasts, as fires and tubes do not require cleaning. The average evaporation is about 13 lb. of water from and at 212 deg. F. per lb. of oil consumed, against 8 lb. to 8½ lb. per lb. of coal. There is thus a gain of about 50 per cent. in steam production per unit weight of fuel. This means that where 1000 tons of fuel is carried, the ship using oil will have a radius of action 50 per cent. greater than one using coal, other things being equal, or for the same radius the oil fuel carried may be 33 per cent. less in weight. As such reduction affects all dimensions and propelling power and weight of machinery for the same speed, the decrease in displacement tonnage is very much greater.

Reduction in weight carried.

This gain, due to the higher heat value of oil, is apart from other well-appreciated benefits resulting from the adoption of oil fuel only,—in being able to refill bunkers in the minimum of time and with little expenditure of labour, in storing the oil anywhere suitable, and in avoiding the labour of trimming and of moving coal to a point accessible to the stokers. All these advantages are augmented with increase in speed. In a battle-cruiser burning anything up to 60 tons of coal per hour, much handling is needed as compared with the the mechanical flow of 40 tons of oil through pipes. However the coal bunkers may be arranged, the use of 1400 tons in 24 hours, or

even 470 tons in an eight-hours' spin, calls for much work within the bunkers. Again, in coaling ship, although there are very great achievements by the ships' crews, it must be remembered that the crew after a fight will need rest, and the work of labourers, not organised and without that spirit of rivalry common to all ships' crews, will fall far short of these performances, and thus the ship will be longer away from the fighting line than when oil may be pumped on board while the ship is at sea. With these high-powered vessels, thousands of tons of fuel must be dealt with on such occasions.

Reduction in space required.

Not only is the weight and space required for oil-fuel boilers reduced by the decrease in heating surface but by the decrease in the space in front of the boilers, since no fire cleaning tools are used, all that is necessary being an arrangement roomy enough for drawing tubes. Coal and ash handling appliances are not needed, and here also space is saved, while holes in the side of the ship for ash-ejectors may be dispensed with. But the greatest economy in space is in respect of fuel storage. Where a high rate of coal consumption is desired, coal bunkers athwartships (or 'tween decks with coaling trunks to the stokehold) as well as along the sides are necessary, especially in ships with such broad beams as 92 ft. With oil fuel no bunkers adjacent to the boilers would be required, and the boiler space, including bunkers, would be 30 to 40 per cent. less were the oil stored between bottoms. There would result a shortening of the ship, a reduction in displacement, and a decrease in power and weight of machinery for the same speed; or the saving could be utilised to add to the effectiveness of any or all of the fighting elements. There may even be some saving in weight in the boilers for oil burning.

Experience with oil fuel.

As with the question of large and small tubes in boilers so with oil *versus* coal, there is practical experience upon which to found deduction. The mechanical details have been greatly improved, and no obstacle presents itself in this connection. The requirements for success, and the means adopted to meet them, may be briefly described. The flash-point of the oil is about 200 deg. F. and its specific gravity 0·88. No trouble need therefore arise on the score of inflammability. To ensure effective atomising the oil is heated to from 125 deg. to 150 deg. F., and in forcing the fuel through the burner constant pressure is exerted. The spraying of the oil from the burner is effected by pressure produced by the oil pumps, no steam or air being used; the pressure averages about 200 lb. Combustion should commence within an inch or two of the nozzle of the burner. There should be a surrounding volume of air around the base of the burning conical flame to protect the front boiler casing and the burner tuyeres, and to ensure complete combustion in the furnace. In triangular boilers of

the Yarrow type, equal to 3000 horse-power, the combustion space should be about 500 cubic ft. This varies with the type of boilers.

Small tube oil-fired boilers for all ships.

There thus seems no unsurmountable difficulty why the smaller tube boiler should not be adopted for all ships, as the same essential requirements exist, viz., to obtain the greatest amount of steam for the minimum weight. This remark is, of course, subject to such modifications in the thicknesses of scantlings as the special service may render desirable, since durability is more important in the large ships than in the small.

Super-heated steam.

For further reduction in the 5600 tons for machinery of the high-powered warship there are great possibilities from the use of superheated steam. By this means an increase in power of 10 per cent. is obtained on the same weight and fuel consumption, or the same power is developed with 10 per cent. less weight and 10 per cent. less consumption. There is also a saving of water of from 13 to 14 per cent., which means that the condenser, air and circulating and feed-pumps can be reduced to that extent; in other words, with the same weight of machinery an efficient superheater will add 1½ miles per hour to the speed of a 30-knot destroyer with the same fuel consumption. A corresponding advantage is possible with all ships, including battle-cruisers. The advantages of superheating the steam were clearly established in the second-class cruiser Bristol, completed in 1910 by Messrs. John Brown & Co., Ltd., Clydebank.*

Necessary conditions in super-heating.

Certain conditions must be fulfilled in superheating steam. The superheater should, as far as possible, utilise otherwise waste gases; it must be between the tubes or in the uptake, and must not involve a reduction of the water evaporating surface. In the German cruiser Dresden one boiler was utilised for superheating, and the economy realised in superheating was forfeited in the reduced evaporation per unit of total weight. Prolonged reduction in the speed of the ship should be accompanied by a reduction in the number of boilers in use, so that the rate of combustion in the boilers alight will always ensure sufficient temperature in the uptake, or in such position where the superheater is located, to give the desired degree of superheat. Some superheaters are bedded among the tubes; this is of advantage if they do not lessen the evaporative efficiency of the adjacent steam generating tubes, or interfere with the cleaning of the external surfaces of the tubes. Care, too, must be exercised to prevent oil passing over with the feed-water. With turbines this possibility has been minimised; but as the auxiliary reciprocating engines require piston lubrication, a certain amount of oil may pass through the condenser. Even with feed-water filtration there is danger, but Mr.

* See *Engineering*, vol. xc, p. 465, and vol. xci, p. 269.

Yarrow has introduced a system whereby the feed-water ascends only a certain number of tubes furthest from the fire, so that should a deposit of oil occur on these tubes they will be less likely to give trouble or lose their evaporative efficiency. He proposes further to develop this idea by fitting feed-water heating tubes with a separate water-drum or pocket in the uptake on one side of the steam drum. Thus such oil as passes over in the feed-water will be deposited in these tubes far removed from the hottest gases, and easily cleaned. This should lengthen the life of the steam generating and superheating tubes.

Objections to superheating overcome.

The most serious objection to superheaters in naval ships is that, as there are frequent and great momentary variations in speed, with corresponding alterations in the demands made for steam by the turbines and arrestment in the flow of steam through the superheater, the tubes of the latter may get burned. This objection is met in Mr. Yarrow's new proposal to fit a superheater in the uptake at the side of the steam drum opposite to that having the feed-water heater, as there is included a damper on the same side as the superheater, so that when it is shut down it closes the passage of the gases from the combustion space through the superheater, causing them to flow only up through the feed-water heater on the other side of the steam drum. There is a three-fold advantage in this: (1) There is no likelihood of the superheater tubes becoming overheated when raising steam or owing to the flow of steam through them to the engines being arrested in the case of a sudden stoppage of the engines; (2) the steam generated by the tubes on the side of the boiler affected by the damper is lessened temporarily when the vessel is running at reduced speed; and (3) the efficiency of the feed-water heater is raised by the increased flow of gases through it, with the result that the temperature of the feed-water becomes higher and the steam generating tubes are better able to meet the sudden demand made for the acceleration to full speed again.

Experience with steam superheating.

Superheating has long been applied in land service, with highly satisfactory results, especially since the turbine was introduced. In locomotive practice there has been increasing advocacy of its application up to 270 deg. F. In marine turbines, there is every prospect of a great development. Even with purely reaction turbines there is not the difficulty sometimes supposed. The warship running longest with superheated steam has Parsons reaction turbines—the German cruiser Dresden, completed in 1908—and in her case no difficulties have arisen. Experience is being collated in several ships in the British Navy, and German, Austrian and United States authorities have the matter under examination.

Advantages of superheated steam in turbines.

In turbine working advantages accrue from the superheating of the steam, apart altogether from the economy, without any disadvantage, provided care is exercised in the design of details. This applies to the choice of material for nozzles in impulse turbines, of pipes and expansion joints in all turbines, to the design of all regulating and manœuvring valves, and to the workmanship generally, and especially as it affects clearances. In the impulse stages there is obviated any possibility of the cutting action which might be caused by saturated steam. Superheating, too, is to a certain extent a safeguard against priming.

Developments in turbines.

As regards the course of development in turbine design, the adoption of one or more velocity compounded impulse stages at the high pressure end, with the remaining stages of reaction or impulse blading, is becoming very general for the smaller fast ships in our own and foreign navies. The principles of these systems were fully described in the *Naval Annual* for 1910, p. 129, and 1911, p. 107. The combination simplifies the adoption of independent units including high and low pressure turbines on the same shaft, and thus enables twin-screw propellers, instead of three or four, to be applied, where the total power does not involve more than two shafts. There is the advantage too, especially where it becomes possible to increase the diameter of the turbine rotor, that the revolutions of the propeller may be reduced while maintaining a high blade speed. In high-powered ships two independent sets of turbines, each including high and low pressure machines, are still preferred, making four shafts altogether, with impulse and reaction blading for both ahead and astern working. This enables special arrangements to be dispensed with for cruising. Taking for comparison such a case of separate combination turbines as are being fitted in the new French battleships, and a set entirely of reaction turbines with a cruising element at the high pressure end, and both designed for a steam consumption at full power of 12 lb. per shaft-horse-power per hour, it is probable that the former will show an advantage in steam economy of 2 per cent. at half-power, of 13 per cent. at one-fifth power, and of 10 per cent. at one-tenth power. These figures, however, will vary in individual cases, according to the weight and to other similar considerations. It may be accepted that at less than one-fourth power the impulse-reaction turbine will be 10 per cent. more economical than the purely reaction turbine, other things being equal. The issue, like so many others, is, however, complicated by the question of weight, especially where lightness involves smaller turbines, as this means reduced economy.

Less, however, is heard now of the higher steam consumption of

Geared turbines.

the turbine at low powers. One is apt to forget that a falling off at the lower fractions of power is common to all systems, and that, even if this is slightly greater in the turbine, there are other advantages which more than compensate for it. But various modifications to ensure higher economy at low powers are being tried. A promising experiment is in the fitting of helical gearing between the high-pressure turbine and the shaft carrying the low-pressure turbine. The former can therefore be run at the speed giving maximum efficiency, while at the same time the diameter of the turbine may be minimised and the ratio of clearances to blade height reduced. Thus there will be less loss from leakage, especially at reduced speeds. It has been established that such mechanical gear involves a loss of only 1½ per cent. For the same reasons it has been fitted between the turbine and propeller, notably in two 20-knot speed steamers for the London and South Western Railway Co.'s service. In this case the aim is to combine high-speed turbines with low-speed propellers so as to secure a propeller having a ratio of pitch to diameter giving the highest efficiency. Most satisfactory results have been realised in these vessels.

Turbines and electric propulsion.

Similarly, there are being tried applications of electric machinery between the turbine or other prime mover and the propeller. Such alternative systems of power transmission between turbine and propeller—mechanical and electrical—are being tried in colliers now being completed for the United States Navy, and we have promise of exhaustive tests and of complete data, since the Washington authorities are liberal minded in their disclosure of information for the advancement of science. The Engineer-in-Chief, Rear Admiral H. L. Cone, supplies information concerning these systems. Both colliers are twin-screw vessels of a displacement tonnage, when loaded, of 19,300 tons, to steam 14 knots. In the Neptune the steam pressure is 200 lb., operating Westinghouse-Parsons turbines on each shaft, running at 1220 revolutions and developing 3600 shaft-horse-power. The helical gear reduces this rate of revolution to 135 per minute, the speed ratio being thus 9 to 1. So far the arrangement corresponds generally to the Parsons gear in the Vespasian, where the ratio of speed reduction is 19·9 to 1, and where the two turbines work through the helical gear on to a single shaft, the vessel having been originally a single-screw steamer. In the Westinghouse system the gear pinions are carried in floating frames supported by oil pistons, with the idea of taking up any irregularities in the gear; but Sir Charles Parsons has not thought this necessary with well made gear. In the other United States collier of exactly the same dimensions, the Jupiter, the speed reduction between turbine and propeller is

18 to 1. In this case the turbine, running at 2000 revolutions per minute, drives an electric generator which delivers current with a potential of 2300 volts to an induction motor on each of the two shafts. The loss of power in transmission in this case is expected to be 9 per cent. as compared with 2 per cent in the Neptune. A third collier, the Cyclops, now in commission, has reciprocating engines with a coal consumption of 1·5 lb. per I.H.P. per hour, and there will thus be opportunity for comparing the efficiency from boiler to propeller of three systems.

Advantages of electrical propulsion.

Advocates of electric transmission, notably Mr. H. A. Mavor, Glasgow, admit that (his words are quoted) "where direct drive from the turbine to the propeller is possible, there would be no sense in adapting electrical means of transmission, and hence I make a reservation as to high-speed vessels in advocating the applicability of the system." A reduction in efficiency with screw propellers driven by turbines is not inevitable. It is nevertheless desirable to consider the possibilities of electric transmission of power in the case of high-powered warships in the light of practical experience gained within the past twelve months. Electricity is used in ever-increasing measure on board warships, and were the turbines employed for driving electric generators for propulsion, part of the current produced by the main generators could be utilised for any other purpose—for actuating the various motors in the gun turrets, for running the air-compressors in connection with torpedo firing, for working projectile, ammunition and boat hoists, for operating steering gear, capstans, anchor gear, bilge, sanitary, water service and other pumps and ventilating fans, and also for lighting the ship. Electrical mechanism for such duties presents no mechanical difficulties; applications have proved the practicability of the system, although there is hesitancy in adopting it owing to the difficulty of discovering the position of leakage. As all motors are never in use at any one time the turbo-generators need not be equal in producing power to the maximum demand, and thus there would be a more uniform "load." Moreover, many generators could be installed in independent units, and the number running at any one time could be regulated to suit the immediate demand, so that each one in operation would be working at the speed which would be most economical alike in turbine and electric generator. There is thus much to be said in favour of a central electric station producing current for use for all purposes, including propulsion.

Applications for electric propulsion.

In cases of electrical propulsion the turbo-generator need only work in one direction; the motor on the shaft provides for ahead and astern motion; the generator, too, may run at the high

speed required for turbine efficiency, and the motor at the low speed essential to propeller efficiency. Mr. Mavor, in the system he has fitted, and is fitting, has arranged several circuits and several poles in his motors, so that there is a wide range in the power delivered to the propeller and consequently in the speed of the ship. Thus, in a 245-ft. canal barge, where there are three 200-H.P. Diesel engines driving alternating current generators, there are separate windings on the three-phase motor keyed to the one propeller shaft, so that the motor may run at one-third power, two-thirds power, or full power, using respectively one, two or three of the oil-engine electric sets. This is advantageous, as the barge runs at 3 to 4 knots on the canals, and at 8 to 9 knots on the lakes. A merchant vessel, Frieda, for trading between New York and the Gulf of Mexico, has two cylindrical, oil-fired Howden-draught boilers supplying steam at 200-lb. pressure to a turbo-electric generator of 1500 kilowatt capacity at 3000 revolutions. This latter supplies 3-phase 50-cycles current to a motor of 1900 B.H.P., driving one propeller shaft at 84 revolutions. With this system the Frieda, 300 ft. long, is expected to make 12 knots, when carrying 5000 tons of deadweight cargo, on a daily fuel consumption equal to 30 tons as compared with 40 tons for reciprocating steam engines.

Experience with electrical propulsion.

Experience with the first small vessel fitted shows that, with short circuiting, damage will not result, that troubles need not arise from water, and that the squirrel-cage system of motor makes a strong construction suited to meet the hard conditions obtaining on board ship. As to multiplicity of links in the "chain" of transmission, electricians contend that there is less complication and fewer individual parts than with reciprocating engines, the turbine and generator being one part and the motor another. One more advantage is that as the turbines can be placed higher in the ship than when direct-coupled to the propeller shaft, the condenser can be placed at a lower level, with its exhaust port at the bottom instead of on the top, and among other resultant benefits is the fact that the turbine can be started up in 20 or 30 minutes instead of taking $2\frac{1}{2}$ to 3 hours. To minimise weight the voltage is made 2000, but even then the electric motor of the 12-knot twin-screw United States collier, already described, is 15 ft. in diameter. It remains to be seen generally how the weight of all machinery will be affected in the case of high-powered ships, and whether electric motors for auxiliaries, pumps, capstans, etc., would not be heavier than the steam engines now used for driving them. There are many items in this question of weight.

The problem of higher economy at cruising speeds is being

Cruising oil engines in a destroyer.

tackled in one other way—by the adoption of internal combustion engines in a British twin-screw torpedo-boat destroyer for cruising speeds, turbines being used at high power only. The oil engines in this installation, which are being fitted by Messrs. Thornycroft, are mounted at the forward end of the shafts which carry the turbines. In the combination of turbines with internal combustion engines referred to, the internal combustion engine when driving the shaft at low speeds is also revolving the turbines. To minimise the loss of power due to this there must be a vacuum in the turbine, and, where the auxiliaries are electrically or air driven, this involves steam being maintained and the condenser air and circulating pumps, etc., being in operation. In the Yarrow system of combination of turbines with Diesel engines, the turbine shaft is made hollow, and the shaft of the Diesel engine passes through the hollow, and is connected to the propeller shaft abaft the turbine by clutches, so arranged that either the turbine or the Diesel engine can drive the screw shaft independently of one another, and without the necessity of the Diesel engine making the turbine revolve. It will be remembered that in the destroyer Velox steam reciprocating engines were similarly used on the inner two of four shafts, all of which were driven by turbines at full speed, but these engines were subsequently replaced by cruising turbines. The performance of this combination of oil engines and turbines will be compared with other systems, i.e., turbines with gear between the high and low pressure machines, with ordinary installations of twin-screw impulse and reaction turbines, and with triple and quadruple screw-shaft sets of turbines working in series, as fitted in earlier vessels. Although with a combination of oil engine and turbine additional weight, as represented by the oil engine, is carried at full speed without being useful, and may thereby reduce the full speed by about 1 mile per hour, yet there is great gain in economy when cruising, and the radius of action at cruising speed may be $2\frac{1}{2}$ to 3 times greater. Does the one balance the other?

Oil engines for German battleship.

The other important combination of oil engines and turbines is that for a German battleship, the former for the centre and the latter for the wing shafts. This machinery of the Nuremberg type was intended for the Prinz-Regent Luitpold, but as the engine was considerably delayed for experiments, it was decided long before the launch to fit turbines on the centre shaft instead of the oil engine, and to complete the latter for a later battleship. It is further significant that an oil engine built at the same works for a cargo ship, and run satisfactorily for long periods—about a month—is now to be reserved for experimental work, while another oil engine, more resembling the marine steam type, is being made for the

merchant ship. As to the battleship engine, three of the cylinders, of about 32 in. in diameter, had been completed for some months, and had been worked on long continuous runs on the test bed, modifications having from time to time been made. Three other cylinders were to have been constructed, so that the complete engine would be of six cylinders, collectively of 12,000 B.H.P. It was of the two-cycle, double-acting type. In February, however, a serious accident occurred, causing the death of several men and the almost complete destruction of the three-cylinder engine. Oil gas found its way into the air delivered by the scavenging pumps, forming an explosive mixture. The wooden building around the engine took fire, injuring the engine. The work of building the engine had therefore to be commenced anew. This new engine will also be on the two-cycle principle, which is generally finding most favour.

In the original four-cycle system there was the explosion, followed by the exhaust (return) stroke, then a suction or air admission stroke, and finally a compression (return) stroke preparatory to another impulse or explosion, as in motor-car engines. With the two-cycle system every outward stroke is an impulse or explosion stroke, and during the return the products of combustion are expelled under air pressure for a brief part of the return travel of the piston—a process known as scavenging—the remaining length of the travel being utilised for compressing the air in the cylinder up to about 500 lb., when the heat due to compression is sufficient to ignite the oil sprayed in at the end of the cylinder by means of air under high pressure, from 700 lb. upwards.

Arrangement of scavenging pumps.

In the German battleship engine, the pumps for the scavenging air, which never exceeds 8 lb. pressure, were worked from the main crank shaft, but now there is generally a strong preference for placing those pumps in the same position as the air pumps in steam reciprocating engines, and working them by levers from the engine crosshead. The compressors for supplying the high-pressure air for spraying the oil into the cylinder are entirely separate from the main engine, and will keep the air storage bottles or reservoirs charged. This also is a widely approved system, as high-pressure air may be required for manœuvring or when the main engine is not at work, so that independent air compressors are preferable. The double-acting principle, adopted in the battleship engine, is not so generally favoured at present. That it must ultimately be the practice is accepted; in this it resembles the steam engine. By getting impulse or explosion on each side of the piston, the power per unit of weight, or from a cylinder of given diameter, is nearly doubled; but it is felt by many that it were well to attain sound mechanical success with the

single-acting engine before introducing the undoubted complication of the double-action.

Designs of oil-engines.

A difficulty with all oil engines, more especially of the double-acting type, is their great height as compared with that of steam engines, and still more as compared with the turbine. This is more or less inherent to the system. Some Continental designs otherwise involve great height and a need for longitudinal, if not also lateral, staying, which is opposed to that free movement desirable in view of rapid alternation of expansion and contraction. The width of the bed-plate is being increased now that marine engineers are introducing into designs, originally evolved by engineers having experience only of land-engine practice, such modifications as are required to suit marine conditions. The marine reciprocating engine is the product of fifty years' evolution, and its general features have been settled from other reasons than caprice, so that oil engines which assimilate these features will gain the greatest support. We are only at the beginning of a new era, but two years' study has brought great changes. The crank pits are now to be open instead of being closed, as the marine engineer has always been accustomed to free and continuous inspection. There is a probability that forced lubrication of bearings will be adopted generally, but even then an easily removable crank pit cover will suffice. Again, greater freedom of access is being arranged; this is much needed in many cases. In some engines the great pressure on the cylinder covers is taken by long steel bolts passing from cylinder to bedplate, which is most inconvenient. The marine engineer is designing column tops, so that the pressure is taken in a direct straight line to the column, and there are then no direct bolts to the bedplate. The trunk piston with a gudgeon-pin attachment direct to the connecting rod, as in motor-car engines, is discarded because the piston rubbed against the cylinder wall and increased wear and lubrication troubles. The crosshead, too, is more accessible. With a crosshead working in external slipper guides, and a connecting rod, as in steam engines, only the piston rings, and not the piston, touch the cylinder walls, and even then the former are in a state of equipoise. The scavenging air-pumps are best worked by a lever from the crosshead, even in single-acting engines, and not by the crank shaft. The high-pressure air for spraying the fuel oil may be got from compressors of the vertical type, worked from the main crank, or by compressors with three radially arranged cylinders of the Reavell type, set at 120 degrees to each other, worked from the main crank. Both systems improve the turning moment, and reduce vibration of the main engine. In large installations a separate oil-driven compressor has great advantages. In one or two cases a

separate oil engine works a compressor up to 300 lb. pressure, and drives also electric generators, which supply current for working winches, etc. The 300 lb. air is stored in large reservoirs, which enable the main engine to be manœuvred for a long time or to be reversed many times. Such 300 lb. air, too, is supplied from the reservoirs to high-stage compressors, worked from the main crank, to raise the pressure to the 700 lb. to 1000 lb. necessary to spray the oil fuel.

Large experimental oil-engine cylinders.

These several improvements bring the oil engine within the range of practical application, but so far little has been accomplished in the manufacture of large cylinders. In France there is at work a 1250-B.H.P. Carels cylinder on the two-cycle, single-acting principle, and various lines of experiments continue, for instance, with different cylinder covers to determine the best arrangement of valves and whether one or three oil fuel sprays give the better result. In this country a 1000-B.H.P. cylinder of the same type is being constructed. When the tests have yielded their full measure of guidance for designing an engine with five or six corresponding cylinders little time need be occupied in producing a complete installation for a ship. In Switzerland a 2000 H.P. cylinder is being made for experiment.

Submarine boat oil engines.

The engines built for submarine boats afford useful data and suggestion. These are now developing powers equal to that of the most powerful cylinders in oil-driven merchant ships. They are nearly all of the two-cycle, single-acting type. Messrs Vickers have taken a prominent part in the development, but have succeeded in keeping their work secret. The F.I.A.T. engine, which is to be fitted in the British submarine boat, "X," to be built by Scott's Co. of Greenock, is much used in Italy up to 1000 B.H.P. at 150 revolutions. In other countries also the two-cycle, single-acting engine is preferred, but the double-acting engine is being put forward. The largest Continental submarine boat engines seem to be the twin-screw set, totalling 2400 B.H.P., of the Nuremberg type, being built by the Société de la Loire for one of the large French submarine boats. For small craft a large number of Diesel type and semi-Diesel type engines are being built. In 1911 there were launched for the Merchant Service thirty-six small vessels with internal combustion engines, in addition to a great number of vedette boats. Experience with these engines will influence practice in oil machinery.

Merchant-ship oil engines.

Excluding the three 32-in. cylinders forming half of the German battleship engine, six of which will total 12,000 B.H.P., the largest marine oil machinery built totals 2500 I.H.P., of the type designed by Messrs. Burmeister and Wain, Copenhagen, and fitted in passenger and cargo ships—Selandia and Jutlandia. These engines

are of the four-cycle single-acting type. In each engine there are eight cylinders, 20·87 in. in diameter, with a stroke of 28·74 in. Thus the power per cylinder of this diameter is well under 200 H.P. These dimensions suggest how hopeless the four-cycle engine is for warship work because of the number of cylinders required. In addition, there are in each ship two separate four-cylinder engines of the same diameter, supplying 300-lb. air to the main engines for starting and reversing and for driving generators. Part of the 300-lb. air thus compressed is utilised in a crank-driven high stage air compressor, working to from 700 lb. to 1000 lb., for spraying the oil fuel. There is also an oil fuel donkey boiler to supply steam for blowing the ship's siren, to run a steam-driven stand-by compressor, and to work capstans and other gear in harbour. All the auxiliaries, including the steering gear, are electrically driven. The largest engine building is by Krupp, and is for a 10,800-ton steamer for the German branch of the Anglo-American Oil Co. Each of the two sets is of 1750 B.H.P., and the six cylinders are each of 22·45 in. diameter, by 39·4-in. stroke. They work on the two-cycle single-acting principle and at 125 revolutions the power per cylinder is under 300 H.P. A notable set of twin-screw Nuremberg double-acting engines completed is of 1700 B.H.P. for a 3500-ton steamer. There are six cylinders in each engine, and each is 18$\frac{7}{8}$-in. diameter, by 28$\frac{1}{2}$-in. stroke, developing, at 125 revolutions per minute, nearly 300 B.H.P. per cylinder—a figure which, in conjunction with the diameter, indicates the higher power possible with double-action when compared with anticipations of the design already stated for single-action. The most advanced large Carels engine—a type winning much favour—is being constructed by Messrs. Schneider for the France, a ship of 4920 tons. The power of each engine is 900 B.H.P., and the four cylinders—two-cycle single-acting—are each 17·72-in. diameter by 22·05-in. stroke. A Carels engine of 1000 B.H.P. is being constructed by Messrs. Richardson, Westgarth & Co., Middlesbrough. The crank pit is open, the columns splayed, and the scavenging air-pump is driven from crosshead levers, while the high-stage compressors are of the Reavell type, operated from the end of the crank shaft. In all these respects this engine conforms to steam practice, and to this extent differs from the engines of the France. In Russia there are two small gunboats with oil engines.

Advantages of the oil engine.

These particulars do not indicate great developments so far as the power per cylinder is concerned, as there are none exceeding 300 B.H.P., but the number of large mercantile sea-going ships being fitted—four were launched in 1911, and many more are in progress—prove increasing confidence in the new prime mover.

The advantages are seductive if reliability at sea can be ensured, and we are fast reaching such reliability. As to gain, under the most favourable conditions only 13 per cent. of the heat stored in coal is converted into work in the steam engine, while the percentage is 35 per cent. to 40 per cent. in the case of the oil engine. The fuel consumption per B.H.P. is 0·45 lb. of oil in the internal combustion engine as against $1\frac{1}{4}$ lb. of coal in steam machinery. In addition there are advantages in weight and space upon the complete machinery installation.

Auxiliary machinery.

The oil engine requires its separate air compressor and reservoirs and one or two other auxiliaries, but in this respect it does not demand the same number or weight of machines as does a steam installation. Taking the battle-cruiser Invincible, of 43,000 H.P., as an example. The steam plant needs some eighty separate engines of about 2800 I.H.P., and the majority of these are the heaviest "steam eaters" for their power in the ship. All of these, as well as the condensers, could be dispensed with in an oil-engined ship. The main engine compressors could be utilised in the production of the high-pressure air for torpedo firing and for some work in the big gun turrets, and there would be advantage in thus concentrating the air-compressing work, as part of the air raised to the 700 lb. or 1000 lb. pressure for fuel injection in the main engines could be stored, and, when required, passed to a high-stage compressor for raising it to the 2500 lb. pressure for torpedo firing.

The capstans and other deck gear and hoists could be worked by compressed air, but as electricity is required for lighting and other operations, these auxiliaries, as well as the hydraulic power plant, could be operated by electricity from the oil-engine driven generators. Even the oil-engine exhaust might be utilised in connection with the distilling plant and hot water service. There are possible advantages from such concentration of the prime-moving media.

Oil supply.

The question which disturbs shipowners as well as naval authorities, however, is as to whether the superior thermodynamical efficiency and the advantage from reduced weight and space will not be more than counterbalanced by future increases in the price of oil, as compared with current prices of coal. This fear is not justified so much by possible deficiencies in supply as by the ownership of oil fields being concentrated in such few hands as to encourage market manipulation and price inflation. As to supply, it is computed that, were all naval and merchant ships driven by oil engines, the amount of fuel required would be from 24,000,000 to 25,000,000 tons per annum. In the past two years the oil output for

the world increased by about 10,000,000 tons, and in six or seven years it has gone up from 28,750,000 to about 50,000,000 tons. In 1904 it was 28,750,000 tons, in 1908 it reached 38,000,000 tons; it advanced in 1909 to nearly 40,000,000 tons, and in 1910 jumped up to over 47,000,000 tons, and this year it should be about 50,000,000 tons. This total, however, means crude oil, containing all the light oils which are extracted by distillation before the heavy oil used in engines is obtained. The proportion of heavy oil is never more than one-half of the total of crude oil; indeed, one-third is nearer the correct figure. Thus little more than one-third of the 50,000,000 tons of crude oil produced is suitable for the internal combustion engines described.

Distribution of world's supply of oil.

The United States takes first place among the producing countries, providing 64 per cent. of the world's supply, and four new petroleum fields were opened out in the Middle West in 1910. California is now the principal oil yielding State—giving between 8,000,000 and 9,000,000 tons per annum—Oklahoma Territory is next, and Illinois third; these three give three-fourths of the supply from the United States, and more than one-half of the world's supply. Russia is the second most prolific producing country; but the output, which in 1910 was about 9,000,000 tons, shows little increase over a period of years. Great hope is still taken in the Maikop field, but experience shows that the oil is at a greater depth than was at first anticipated. Baku wells are yielding less than formerly, due, it is said, to partial exhaustion and to the greater depth at which oil must be sought. In two years there has been a decrease of 32 per cent. in the supply from this district. The Galician field, which used to take third place, is on the wane. Roumania shows development, and the output in 1911 was one and half million tons, or three times that of 1906. There is progress, too, in the Dutch East Indies, the total for 1911 being 1,624,000 tons, against 1,000,000 tons in 1906. These are the principal foreign sources of supply, and their location is of strategical interest.

British Colonial oil fields.

Exploration is being actively pursued in, and is certainly not being neglected, by British possessions. This applies to Burma, where the yield is developing. Oil is known to exist, and springs have given oil in the Punjab and Baluchistan. In Canada and the West Indies (notably at Trinidad and Bermuda), on the Gold Coast and in Nigeria, development work is in progress; indeed, an experimental supply from Trinidad is now being used in boilers in British naval ships. Generally petroliferous deposits are more widely distributed than was supposed to be the case even a year or two ago.

Extended use of oil.

It must not be forgotten, however, that oil as fuel for boilers is in great demand for land service. American locomotives, for instance, now use over 3,000,000 tons of oil per annum for this purpose, and this is a rapidly increasing quantity. The time is fast approaching when oil will be exclusively used in all warships, not only in the British Navy but in all Fleets. A feature conducive to fairly reasonable prices continuing is that the mechanical appliances for recovering oil from great depths are improving in efficiency without increasing in first cost, so that it may be found practicable to work at great depths more economically in the future. The expense of transit by piping and of transport by tank steamers is lessening.

The machinery of the battle-cruiser of the future.

Thus the oil engine is certain to come into favour for many merchant ships, and has potentialities also for large warships. At present much research work is being done which will yield definite data and encourage development. Full consideration of the results so far achieved with all types of machinery suggests, however, that, although this new prime mover has claims for moderate powers, it does not assist towards the solution of problems affecting such high-powered warships as battle-cruisers of 28 to 30 knots speed. The conclusions, almost inevitable, are that, in such ships, if not indeed in all high-powered fast ships, boilers with small tubes should be adopted and worked under greater pressure, that oil fuel should be exclusively used irrespective of its first cost, that steam should be superheated to the extent of 100 deg. F., and that the combined impulse-reaction turbine, with or without power transmission gear, will ensure high economy at reduced as well as full speed. These offer probabilities of satisfactory solution of the problem of augmenting propelling power without involving a proportionate increase in the weight of machinery. The alternative designs of steam and oil engines being manufactured for ships of the British Navy, and the care exercised in collecting data for guidance towards future improvements and developments, establish the fact that the engineering work of our Admiralty is, to say the least, in no respect behind that of other Powers, and that while reliability is very properly a first consideration, enterprise is readily favoured and risks prudently encountered.

ALEX. RICHARDSON.

CHAPTER VI.

Naval War Staffs.

There is reason to expect that the organization and character of the Naval War Staff, as outlined in the First Lord's Memorandum, dated January 1st, 1912, and further explained to the Fleet in a circular dated March 11th, will commend themselves generally to the good judgment of the Naval Service. That the scheme has been accepted with reluctance by some officers is no doubt true. Certain safeguards were and are necessary, such as that of protecting the Navy from the danger of the rise of a distinct and privileged class of officers for whom commands and appointments would be reserved. Such a result could have no other effect than to weaken the spirit of comradeship in the Fleet and to discourage a large class of deserving and meritorious officers. But if this consequence be averted, the wisdom of what has been done will be generally recognised. The best feature of the scheme is that it is the outcome of organic growth within the Admiralty departments, which have developed and changed to meet the new conditions and complexities of the Naval Service. The existence of the Board of Admiralty is a potent and highly beneficial factor in the creation and sphere of action of the new Staff. It may be contended with reason that the War Staff implies nothing that is really new. Certainly all its functions have been executed—and executed with unexampled success—in the past, and when its organisation and duties are examined it will be seen that nothing more than a new and better form and an enlarged system are given to things which existed already. It is also a paramount merit of the scheme that it is based neither upon military nor upon foreign parallels.

The command, leading, and conduct of troops in the field, if they do not differ in all respects in kind from the command and handling of ships and fleets, differ profoundly from them in degree. The differences, indeed, may well be so great as in their consequences to be fundamental. The campaign of Hawke which ended at Quiberon Bay, the long blockades of Brest and the Atlantic ports, and Nelson's blockade of Toulon, showed that the business of supplying and maintaining a fleet demands both experience and knowledge, but, as the First Lord's Memorandum stated, war on land varies in every country according to numberless local conditions, involving the thinking out of a whole series of intricate arrangements and elaborate processes. In other words, the sea service has nothing to do with

problems arising in the transport and supply of various military units, as affected by muddy roads or no roads at all, flooded rivers, broken bridges, and a hundred other circumstances of land warfare. "The sea, on the other hand, is all one, and, though ever changing, always the same; every ship is self-contained and self-propelled."

Evolution of the British Staff.

Still more important is it to observe the manner in which the system of the British Naval War Staff, or Admiralty War Staff, as it is styled in the Navy List, differs from the systems prevailing abroad, where complications arise from the want of any organisation answering precisely to the Admiralty Board in this country. These differences are mainly the subject of the present chapter, but it is first necessary to show the gradual development of the British Naval War Staff from earlier organisations in order to explain some dangers that have been avoided. It may be argued with reason, that after Sir James Graham had abolished the Navy and Victualling Boards, and absorbed the Civil Departments in the Admiralty, the Sea Lords became inevitably more and more engrossed in the complexities of a vast material business, and consequently had fewer opportunities of studying problems of war and war training than had their predecessors, until, at last, the constitution of a Naval War Staff became imperative. This great transfer of business took place in 1831, Sir Thomas Masterman Hardy being at that time First Sea Lord, but it was not until 1883 that the Foreign Intelligence Branch came into existence. It had a modest beginning and was not regarded with much favour, and in 1886, when some reduction was projected, Lord Charles Beresford, on that and other grounds, resigned his seat on the Admiralty Board, and proposed the institution of a Naval Intelligence Department.

Intelligence Department.

There is no intention of recording the history of the Intelligence Department here. It continued to do useful work, conducted in a few dusty and inconvenient rooms in Whitehall, endeavouring to master the significance of every fresh development of naval science, and formulating plans for use in the event of the outbreak of war. It was the agency always available to the Admiralty for duties of this kind, and those who were acquainted with its work knew that, as time passed on, the title of Intelligence Department became a misnomer, intelligence, as such, forming the least important part of the duties of the Department. The conspicuous success of the German Great General Staff of the Army, under the guidance of Moltke, had impressed itself upon the minds of thinkers in every country. The Hartington Commission of 1889 toyed with the subject, and it was first brought prominently to public notice by Mr. (now Professor) Spenser Wilkinson, in a little book entitled "The Brain of the Navy," 1895. It may be questioned, however, whether that writer has

greatly influenced the changes which have subsequently taken place. He regarded the Board of Admiralty as a "legal fiction"; it recorded nothing and was altogether subservient to the First Lord. What he desired was a Moltke for the Navy—the best naval strategist in the Service—and no one was to stand between him and the Cabinet, as represented by the First Lord of the Admiralty. "If you have a first-rate strategist, with an office of picked and trained officers as assistants, to work at the arrangements for a possible war, it would evidently be absurd to put another man as a buffer or telephone between him and the Cabinet which needs his advice." Evidently, then, in this conception of the case, the high strategist could be no other than an invigorated and responsible First Sea Lord.

The First Sea Lord and the Chief of the Staff.

The developments which have taken place have not led to this result, and the First Sea Lord stands between the Chief of the Staff and the First Lord. The Admiralty Board had a clear view of one vital necessity. There must be a direct line in the naval hierarchy from the Staff up through the Board and the First Sea Lord to the Cabinet Minister. The latter as a civilian is, by the very nature of things, incompetent to decide between two distinct lines of policy advocated by responsible naval authorities. It was of the utmost importance to guard against this manifest danger. Any other arrangement would be contrary to the highest traditions of the Service, and fraught with insecurity and the promise of disaccord. As to the view expressed in some quarters that the Chief of the Staff should present an annual report to Parliament, thus superseding the Board of Admiralty and overriding his senior officers, there could, of course, be no parley with a contention so palpably absurd.

Progressive changes.

The sub-committee of the Committee of Imperial Defence, which was assembled to investigate the grave charges of naval unpreparedness made by Lord Charles Beresford, in a letter to the Prime Minister, dated April 2nd, 1909, finding that there were differences of opinion amongst officers of high rank regarding important principles of naval strategy and tactics, stated in their report, dated August 12th, 1909, that they looked forward "with much confidence to the further development of a Naval War Staff," from which the naval members of the Board might be expected to derive common benefit. Two months later a change was made "in further development of the policy which has actuated the Board of Admiralty for some time past of organising a Navy War Council." The Naval Mobilisation Department was brought into being under the direction of a flag officer (Rear-Admiral H. G. King-Hall), and took over that part of the business of the Naval Intelligence Department and the Naval War College which related to war plans and mobilisation. Under the presidency of the First Sea Lord the officers directing the

Naval Intelligence and Mobilisation Departments and the Assistant Secretary of the Admiralty were to form a standing War Council, with which the Rear-Admiral commanding the Naval War College might be associated when the business was such as to require his presence.

Surprise was expressed in some quarters at the leisurely manner in which those distinguished officers, Lord Fisher and Sir Arthur Wilson, proceeded in this matter of organising a Naval War Council or Staff. Perhaps the explanation of the circumstance is to be found in a wise remark made by Moltke in the course of a comment on German Generals and the Army Staff. "There are generals," he said, "who need no counsel, who deliberate and resolve in their own minds, those about them having only to carry out their intentions." "But such generals," he added, "are stars of the first magnitude, who scarcely appear once in a century." This judgment of the great German soldier suggests a further reflection touching the British Naval War Staff. These "stars of the first magnitude," themselves finding a staff a luxury or superfluous, may have foreseen the rise of lesser luminaries at some future time to whom a staff would prove a necessity.

Mr. Churchill's Memorandum on the constitution of the Naval War Staff is printed elsewhere in this volume, and the organisation and duties of the Staff will not be described here, but the diagram given below will illustrate the relations and lines of responsibility and authority in the several departments. It will be seen that the only relations which can properly exist—and the point is of great importance—between the Chief of the Staff and the First Lord must be through the channel of the First Sea Lord. The provision that "the First Lord and the First Sea Lord will, whenever convenient, consult the Directors of the various Divisions, or other officers if necessary," seems, however, to present some risks against which precautions should be taken. British Staff system.

First Lord of the Admiralty.
"Delegate of the Crown in exercising supreme executive power."

First Sea Lord.
For certain purposes holding the "position of Commander-in-Chief of the Navy."

Other members of the Admiralty Board, directing Departments.

Chief of the Staff.
"Primarily responsible to the First Sea Lord."

Intelligence Division.
"War information."

Operations Division.
"War plans."

Mobilisation Division
"War arrangements."

German *Admiral-stab.*

It is interesting to compare this arrangement with that which exists in Germany in the organisation of the *Admiralstab*, though, in view of the fact that the system was partially described in the *Naval Annual* last year, the subject shall be dealt with briefly here. The German Emperor is head of the Navy in a much more real sense than the King is head of the British Naval Service. He is the supreme executive officer of the German Navy, being its professional chief, both in command and administration. The Navy may be, though in practice it is not, controlled by the Imperial Chancellor in the Emperor's name. The Admiral Staff is not upon the same scale as the Army Staff, and its chief and its officers have no executive function, and are unconcerned with finance. They are employed in the duties which are grouped round the function of command. The Chief of the Staff is independent of the Chief of the Imperial Navy Office, and though they may, and do, collaborate in their work, there is no bond between them, and no direct channel, for example, through which the Admiral Staff can influence the development of ship types. These two high officers are both directly subject to the Emperor, whose advisers they are, and the Emperor can call to his counsels any other officer whose appointment places him in an *Immediatstellung* to the Throne. This system is radically different from that which has been adopted in this country, and it presents difficulties and dangers which are only arrested or averted by the exercise of the supreme executive power of the Emperor. The organisation is as follows:—

The Emperor.

Oberbefehlshaber—Executive Chief in Command and Administration of the Navy.

1. Naval Secretary of State. Chief of Imperial Navy Office; deals with everything that costs money.	2. Chief of the Admiral Staff. Concerned with everything that relates to command. Sections concerned with intelligence, plans for operations, mobilisation, and training.	3. C.-in-C. Baltic. 4. C.-in-C. North Sea. 5. Insp. of Training. 6. Chief of High Seas Fleet. 7. Chief of Cruiser Squadron.

This is the organisation and system which were completed by the great changes made in 1899, with the object of separating the functions of command and administration and placing them upon a sure and independent basis. The *Oberkommando* of the Emperor was

then abolished, his Majesty took over the supreme executive command, or *Oberbefehl*, and the section of the *Oberkommando* which had been concerned with staff duties was erected into the independent *Admiralstab der Marine*, with its seat in Berlin, and a responsibility to the Emperor alone.

Origin and early defects of the French system.

The constitution and duties of a Naval Staff concerned with the duties of command must inevitably conform to the requirements of the system of Government under which it serves. A system which is applicable to the command of the British Navy is not applicable to that of the Navy of Germany, and neither system could be applied to the French Navy. It was in 1868 that the French Naval Staff made a modest beginning. The Chief of the Staff in former times had been an officer analogous to our "Captain of the Fleet," who acted as the *alter ego* or right hand of an admiral afloat, and in a similar capacity at a port. Admiral Rigault de Genouilly proposed to the Emperor Napoleon III. that the Minister of Marine should have such a coadjutor, as Chief of the Staff, at the head of the Bureau of Operations, which was to be attached to the Minister's Cabinet. This Chief of the Staff was to act in the Minister's name in order to secure rapid decision in matters in which several departments were concerned. He was the immediate collaborator of the Minister. The organisation of 1868 remained almost unchanged until 1881, when the office of Chief of the Staff of the Fleet was attached to the Staff at the Ministry, as Admiral Cloué said, in order that the Minister might have the whole of the active fleet in his hands. In 1882 an Intelligence Branch was added to the Operations Branch, and in the following year M. Barbey, being Minister, organised the staff more completely, with a certain number of branches executing defined duties. The Chief of the Staff was still to be the right hand of the Minister, giving effect to his policy, and to hold permanent relations with the inspectors-general of the services, and with the Admiralty Council and the Council of Works. So far was this system extended that the Minister of Marine delegated a part of his duties to the Chief of the Staff, and orders relating thereto, issued by the latter, had the same executive authority as if they had emanated from the Minister himself.

The result was that the Chief of the Staff became engrossed in a multitude of business matters which practically precluded him from undertaking his real duties of preparing for war. It was soon discovered, moreover, that he had become too powerful, and M. de Lanessan therefore reorganised his Department and restricted the range of his authority. Whether the Minister was in this influenced by the example of Germany, or by the view that he

himself had been partially superseded, does not clearly appear. The result was that the Chief of the Staff became in practice head of little more than the Operations Branch, and Admiral Bienaimé, reproaching the Minister, said that the Chief and his branches worked *à vide*. "Si vous me faites jamais connaître un acte de l'état-major général, qui puisse compter parmi les progrès de la marine; si vous pouvez me montrer son influence dans la construction des bâtiments, de notre artillerie, dans la mise en accord des différents services, je crois que vous ferez un tour de force." It will be observed that the conception expressed in this statement is altogether different from that which has inspired the German system. The Chief of the Staff would exercise a practical and direct power in the conduct of naval affairs, instead of being an adviser only.

A change in the latter direction was, however, made by M. Lockroy in 1896, when the departments for the Fleet in commission, the Fleet under construction, and the accountant service were separated. The Chief of the Staff was no longer to be an intermediary between the Minister and the departments, but was to be the head of an independent department, *poursuivant son but spécial sans préoccupations étrangères*. In the distribution of business, however, the Chief of the Staff exercised supervision over twelve different branches, including those for staff work proper, naval law, pay and clothing, hospitals, stores, hydrography and submarine defences, so that the last state was almost worse than the first. In 1899 the Chief of the Staff was definitively relieved of his duties as Chief of the Minister's Cabinet, and was stripped of some other duties, so that he thenceforth exercised little other control than that over the members of the naval staff, and had leisure to concern himself more advantageously with the duties of preparation for war. It was subsequently officially admitted that problems, which had scarcely been raised and for want of time had been neglected, were at last in process of solution. In his volume "La Défense Navale," M. Lockroy alleges that, "*des plans de campagne et de guerre, il n'en existait pas en juillet,* 1898 [the period of Fashoda]; *à peine quelques phrases vagues et sans cohésion, écrites sur un cahier.*"

The existing French system.

A decree of January 31, 1902, with some subsequent modifications, regulates the existing organisation of the French Naval Staff, which has been placed under the direct authority of the Minister. Its chief has been relieved of all responsibilities for the various classes of the naval *personnel*, and for the direction of several administrative branches. He has no administrative duties of an executive character, and confines his activities to questions which concern preparation for war. At the same time he possesses what is

believed to be a sufficient, though ill defined, power of survey in affairs having relation to his special duties, and can require the departments to supply such information as he desires. His position is strengthened by the fact that he is a member of the Superior Council of the Navy, which is the nearest approach the French possess to a Board of Admiralty. This system has not been accepted without reservations by some senior officers, including Admiral Bienaimé and Admiral de la Jaille, and undoubtedly questions of the gravest importance are left in a position of some uncertainty. There is still the crucial difficulty of a separation between the functions of command and the executive duties of administration. The Chief of the Staff is concerned with the former. What is his influence upon the latter? The Iéna disaster, and the great shipbuilding programme of Admiral Boué de Lapeyrère, caused this question to be much discussed. It was believed by some officers that the Chief of the Staff could exercise no influence in matters of ship design, but at a Senatorial Committee of Inquiry he said the Minister had consulted him on the subject of the battleships of 18,000 tons, and that, even if he had not been consulted, the decree of 1902 placed upon him the responsibility. If a new gun was to be introduced, a report thereon would be submitted for his opinion. Upon other matters of like kind he said he would be consulted. The Director of Naval Construction considered the decree of January 31, 1902, explicit on the point that the Technical Committee should submit proposals for the *visa* of the naval staff, *parce que celui-ci, étant l'organe chargé de préparer la guerre, y est intéressé au premier chef.* The Director-General of Ordnance declared that there was no disunion in the central administration. *Nous vivons dans la collaboration la plus intime avec le chef d'état-major.* These declarations seem to show that official relations in France are closer than the actual structure of the organisation provides for in Germany; though, of course, it is true that in all countries those who work whole-heartedly for a common object must collaborate in measures for its attainment.

French Chief of the Staff's power of initiative.

But in order that no doubt should be left as to the influence to be exerted by the Chief of the Staff in France, a modification of the decree was introduced in November, 1907, which appears to have been regarded by opponents of the new system as a confession that it was in some respects defective. Except in regard to the movements of the Fleet, the Naval Staff was *un organe d'études*—a thinking body; but if preparation for war requires long and incessant study, it is certain that it demands also an effective and constant participation in the organisation and setting in motion of activities of every nature—*c'est-à-dire une part réelle et*

indispensable d'initiative et d'impulsion, said the preamble of the new decree. Accordingly, the Naval Staff received a "right of initiative," enabling it, in case of need, to prescribe to other departments the execution of such works, experiments, or trials as it may desire. Another important innovation—which appears to have been caused by the events in Morocco—authorised the Minister, after notifying the various Departments, to delegate authority to the Chief of the Staff to issue direct and immediate executive instructions in order to secure rapid despatch of business. This regulation seems to contemplate the situation which would arise during periods of strained diplomatic relations and preparations for war.

The organisation of the French Naval Staff will be best seen by the following diagram:—

President of the Republic.

Minister of Marine.

Chief of the Naval Staff.	Other Members of the Superior Council.
Movements Branch. (Miscellaneous Business.)	Technical, Ordnance, and other Departments.
1st Section (Intelligence).	
2nd Section (Coast Defence and Ports).	
3rd Section (War Plans and Preparation).	
4th Section (Ship Designs, etc.).	
5th Section (Training, etc.).	

The Movements Branch appears anomalous in its civilian character and miscellaneous duties; the 4th Section has given rise to a great controversy concerning the relation of the Naval Staff to the Technical services alluded to above, and the 5th Section is of recent constitution.

Origin of the American system.

In the United States Navy a Naval War Staff, not fully organised, exists under another name. There is some objection in Congress and elsewhere to the word "staff," and the Army Staff seems to be regarded as standing in opposition to the will of the Legislature, and its intended enlargement is opposed. The office of Naval Intelligence was established in 1882; the Naval War College came into existence in 1884, and the General Board was created in 1890. The need of intelligence was brought home to the authorities at the beginning of the new Navy by the many deficiencies that became apparent in the naval resources of the country. The institution of the War

College was a more important step, for the College is in no ordinary sense a teaching establishment. It is a place for the study and discussion of naval problems, of war in all its phases—historical, strategic and tactical—of events which lead up to war, and of the probabilities or possibilities which arise therefrom. Besides carrying on such studies, it prepares and lays before the General Board such schemes as are called for; and in conjunction with the General Board, it prepares plans for all eventualities, and is able to furnish to a Commander-in-Chief in war complete studies of any theatre of war.

General Board and War College.

In an opening address delivered by Captain French E. Chadwick, U.S.N., President of the War College, in 1902, he said he hoped the establishing of a Naval General Staff was accomplished "in the triune organisation of the General Board, the War College, and the Intelligence Office." It is the pride of the Naval War College that it was the instrument for bringing before the world the doctrines established by the master-mind of Mahan. It was the College, in co-operation with the General Board, that prepared the plans for the war with Spain. The General Board advises the Secretary of the Navy on all important matters, such as the question of the Panama Canal, the shipbuilding programme, and the location of the Navy yards and docks. In his report for 1910 Mr. Meyer, Secretary of the Navy, said that during the year the work of the General Board, War College, and Office of Naval Intelligence had been better co-ordinated, so that war plans and strategic studies were "up to date." The principal business of the Intelligence Office is indicated by its name, and the chief duty of the General Board, which has been regarded as constituting the nucleus of a staff, and of the War College, has been to prepare and perfect war plans, and to train officers to understand and execute them. Although the Naval Board is accustomed to put forward its judgment as to what the shipbuilding programme should be, always therein exceeding the views of Congress and sometimes of the Navy Department, its formation was, perhaps, best described by Rear-Admiral H. C. Taylor, U.S.N., in a paper read at the Naval Institute, Annapolis, in 1903, as being to avoid as much as possible questions of material, and "not to say what force we should have, but to prepare for war whatever force Congress should give us."

Be this as it may, the General Board was and is without responsibility for carrying out its recommendations. It has had no executive powers, nor has it had any means of co-ordinating its views with those which emanate from the Bureaus. When Mr. Meyer instituted the "Aids" for his Department, it was with the idea of creating

a means through which effect might be given to policy. "An operating division of the Fleet is a branch that has been lacking in the Navy Department." The Aid for Operations advises the Secretary as to strategic and tactical concerns in conjunction with the General Board, and regarding movements and the disposition of vessels, and he prepares orders for the Secretary's signature covering these matters. There is no executive power, except through the action of the Secretary, and where money is to be expended the consent of Congress is required.

Peculiarities of the American system.

This system is unlike those which exist in the naval administration of Great Britain, Germany, and France. The Aid for Operations is concerned with the work which is analogous to that falling within the province of the British First Sea Lord, but the latter is a responsible officer, acting in practice as Commander-in-Chief of the Navy, while the Aid for Operations is merely an assistant of the civilian Secretary of the Navy, and in no sense controls the Naval General Board. The same is true of the functions of the other Aids, who deal with matters concerning *personnel*, material, works, etc. The Secretary therefore has various advisers, and is merely assisted in co-ordinating policy by his Aids. When the naval programme of 1911 was under consideration, the Naval General Board advised the laying down of four battleships, sixteen destroyers, and a considerable number of scouts and auxiliaries. The Secretary and the Navy Department did not accept the suggestion. They recommended only two battleships, struck out the destroyers, and most of the auxiliaries, and inserted two submarines. Therefore the General Board does not necessarily influence policy, and there appears to be wanting some organization analogous to the Board of Admiralty in the British Service, or the French Superior Council of the Navy. The following scheme of the United States organization must be regarded in the light of the preceding remarks.

President.

Secretary of the Navy,
assisted by Naval Aids.

(Aid for Operations.)	(Aid for *Personnel*.)	(Aid for *Matériel*.)	(Aid for Inspection.)
Naval General Board. Naval War College. Intelligence Office.	Bureaus concerned with these duties.	Bureaus of Construction, Ordnance, &c.	Board of Inspectors. Survey, Shore Stations, &c.

Conclusion.

It is not possible to pursue this question further by an inquiry into the systems existing in the administration of other navies. Enough has been said to suggest that the problems arising from the organization of Naval War Staffs, of co-ordinating the functions

of administration and command, and of advisory and executive authorities, are engrossing attention in all navies. The new system in the British Navy is the outcome of tradition and experience, and certainly is more efficient, as a salutary means of bringing to bear the influence of mature thought upon all naval problems that may arise, than any of the systems that have been examined. In Germany everything turns upon the final executive power of the Emperor. In France the Chief of the Staff occupies a position analogous to that of the British First Sea Lord, but he is directly subject to the Minister, his authority and functions are not the same, and the organisation of the sections of his department is confused with administrative and executive duties, owing to the want of an organic system for co-ordinating the duties of administration and command. In the United States the existence of a strong bureau system operates against the position and influence of the General Board, and gives the Secretary a great many advisers, in dealing with whose counsel he has sought the assistance of "Aids," whose position he is now seeking to establish by legislative enactment.

JOHN LEYLAND.

CHAPTER VII.

Recent Changes in Warship Design.*

A fair appreciation of the character and rapidity of changes made in warship designs, since the advent of the Dreadnought and the three vessels of the Invincible class, must be based upon an understanding of the principal characteristics in which those four ships differed from their predecessors. Keeping in view the nature and extent of the changes made when passing from pre-Dreadnoughts to Dreadnoughts, one can measure more justly the difference between Dreadnoughts and post-Dreadnoughts, or, as it is the fashion in some quarters to call the latest types, super-Dreadnoughts.

ESSENTIAL DIFFERENCES BETWEEN PRE-DREADNOUGHTS AND DREADNOUGHTS.

The turbine as facilitating Dreadnought design.

The essential differences in the designs of the Dreadnoughts as compared with their predecessors may be summarised as follows:—first, higher speed; second, a principal armament of ten 12-in. guns for battleships instead of four 12-in. guns, and of eight 12-in. guns instead of four 9·2-in. guns for armoured cruisers; third, the absence of any secondary armament (7·5-in. or 6-in. guns); fourth, an important change in the distribution of the side-armour. In consequence of these changes, it became inevitable that the dimensions, displacements and costs of the new types should be greater than those of their predecessors.

Most fortunately for naval architects, the genius and perseverance of Sir Charles Parsons placed at their disposal the marine steam turbine at the time when the increase of speed was decided upon. Higher speeds, of course, necessitated the development of greater engine power. Steam turbines provided a means of obtaining a greater development of engine power in proportion to the weight of propelling apparatus—because they proved to be more economical than reciprocating engines in their consumption of steam and coal at or near maximum powers. Consequently, for a given horse-power the use of turbines secured economies of weight and space in boiler

* This chapter was kindly undertaken by Sir William White at my special request.—Editor.

rooms; and, although turbines required somewhat greater floor-space than reciprocating engines, the total floor-space needed for turbines and boilers was not much larger than that required for reciprocating engines and boilers giving the same power. Turbines could be placed lower in the ships, and occupied less height, leaving above them considerable clear space, which would have been occupied by the cylinders of reciprocating engines. Their lower situation in the ship also gave better protection in action. The adoption of the steam turbine, therefore, in the Dreadnought and Invincibles greatly facilitated the attainment of higher speeds on smaller displacements and dimensions than would have been possible had reciprocating engines been employed, as they necessarily were in earlier battleships and armoured cruisers. The principle hereby illustrated is of general application, and has received endless illustrations in ship-design both for war and commerce. Ships of later date always benefit by the march of improvement in science and manufacture; and the fact must not be overlooked when they are compared with vessels built at earlier periods. Not only in propelling apparatus but in materials of construction and naval ordnance the Dreadnought and Invincibles necessarily gained upon their predecessors, and are at some disadvantage as compared with later ships —the so-called super-Dreadnoughts.

Increased weight of armament.

Radical changes in the character of the principal armament of the Dreadnought and Invincibles, although named as the second cause of increased dimensions and displacements, had really the most potent influence on the designs. The use of a much greater number of 12-in. guns, of course, involved considerable increase in weight of armament; five armoured stations had to be provided for the ten guns, as against two such stations in earlier ships; in order to secure large arcs of horizontal command for more numerous heavy guns, some of them were placed at greater heights than heretofore, and this fact necessitated increase in the weight of barbettes and protecting armour. On the other hand, there was a saving in weight by an abandonment of the secondary armament and of the battery or turret armour used to protect it; but, after allowing for this fact the adoption of single-calibre big-gun armaments was necessarily accompanied by a large proportionate increase in weight. In all ship-designs the principles are recognised that increase in the load to be carried at a given speed must involve an increase which is many times greater in the displacement, and that as the maximum speed to be attained becomes higher, the proportion of the increase in displacement to the increase in load will become greater. In the Dreadnoughts, therefore, the cumulative effect of higher speed and

greater load of armament and protective armour was serious and had to be provided for by the naval architect.

Effects upon design.

Furthermore, this radical change in the principal armament carried with it the necessity to provide, below each heavy-gun station, large hold-spaces for magazines and shell rooms, as well as accommodation for the machinery required to work the heavy guns, for ammunition hoists and other appliances requiring adequate protection. In addition (as will be seen on reference to Plates 3 and 9, Part II.) the dispositions of the heavy guns adopted in the Dreadnought and Invincibles involved the necessity for placing some of the heavy-gun stations with their ammunition spaces and machinery near the central portions of the length, where engines, boilers and coal bunkers were necessarily situated. Obviously, this arrangement made it much more difficult than it had been in preceding ships to provide efficiently for the stowage and transport of coal, for easy communications between engine-rooms and stokeholds, and for safe and efficient working of the propelling apparatus. This feature was important, but the main effect of the necessity for greater hold-space (for magazines, etc.), concurrently with the installation of more powerful propelling apparatus required for the attainment of the higher speeds, was seen in the imperative demand which arose for a *considerable increase of length*. Breadth had to be increased in order to ensure satisfactory conditions of stability. Draught of water could not be increased to any great extent without inconvenience and limitation of possible range of action. Experience had led to the general adoption, in the largest classes of British warships, of maximum normal draughts ranging from 26 ft. to 27 ft.; and so far as the normal draughts of the first Dreadnoughts were concerned this condition was observed. In regard to deep-load draughts, however, precedent was not followed, and, in consequence of the new departure in this respect, misleading comparisons have been made between the Dreadnoughts and their predecessors. This important fact will be illustrated hereafter.

Positions of guns.

The disposition of the heavy guns in the Dreadnought (Plate 3) is a modification of a system which had long been used, but was eventually abandoned, by the French Navy, in which four heavy guns were mounted each in a separate armoured station—one on the centre-line of the deck forward, another on the centre-line aft, and one on each broadside. The fifth station in the Dreadnought is placed on the centre-line between the engine and boiler rooms; the foremost station is raised a deck higher than the other four stations, this pair of guns firing over a high forecastle. In the official description of the ship it was remarked that these arrangements were selected

"in order to give the ship good sea-going qualities and to increase the command of the forward guns." The same description stated that "eight 12-in. guns could be fired on either broadside and that four or possibly six 12-in. guns could be fired simultaneously ahead or astern"; adding that "whilst it is recognised that broadside fire is held to be the most important in a battleship, all-round fire is also considered of great importance, since it lies in the power of an enemy to force an opponent, who is anxious to engage, to fight an end-on action." This last assertion has been challenged by some of the highest authorities on naval tactics; and, in later designs for British ships, the disposition of the heavy guns has been changed in a sense which increases greatly the predominance of broadside fire—all the guns being made available over large arcs of horizontal training on both broadsides.

In the Invincibles (Plate 9) the four heavy-gun stations are differently disposed, the arrangement embodying a combination of the two centre-line positions at the bow and stern generally adopted in preceding battleships, with two stations placed nearly amidships and *en échelon*, as was the fashion in "central citadel" battleships built about thirty years earlier. Three of the four stations were placed a deck higher than in preceding ships; the fourth (after) pair of guns fired over the upper deck, and were placed at the usual height. It was considered possible to fire six guns directly ahead or astern; the same number of guns commanded large arcs of training on either broadside, and the remaining pair could, if required, be fired over limited arcs of command on the broadside opposite to that on which the station containing them was placed.

In both types the "anti-torpedo-boat guns" were of small calibre, and without armour protection. "It was considered necessary to separate them as widely as possible from one another so that the whole of them shall not be disabled by one or two heavy shells." In the Dreadnoughts there are twenty-four 3-in. guns; in the Invincibles, sixteen 4-in. guns. The King Edward class had been armed with fourteen 3-in. guns for similar work, and the ten 6-in. guns she carried were also available. The Lord Nelson had carried twenty-four 3-in. anti-torpedo guns, and was also armed with ten 9·2-in. guns carried in six turrets.

The question of "sinkage."

A brief statement will suffice in regard to the changes made in the distribution of the hull armour of the Dreadnought and Invincibles from the corresponding distribution in the battleships which immediately preceded; both systems are admirably illustrated in Plates 3, 4, and 9, Part II. For about three-fourths the length from the bow, the Dreadnought's side armour extends vertically from 5 ft. below

the normal load draught up to the main deck, which is about 9 ft. above the water-line. The upper part of this water-line region is protected amidships by 8-in. armour for about half its depth from the main deck, and by a lower belt of armour having a maximum thickness of 11 in. at the upper half tapering to about 7 in. at the lower edge. Towards the bow the thicknesses are gradually diminished down to 6 in. For about one-fourth of the total length of the vessel, reckoning from the stern, the side armour is 4 in. thick. Advocates of the new type at first insisted strongly on the great advantages attaching to the side armour being extended throughout the length; much was said in condemnation of the "soft ends" of preceding British battleships; but that position has since been abandoned. On the other hand, in descriptions of the Dreadnought and Invincibles attention was not drawn to the fact that the "sinkage" from normal to deep-load draught in the new types was extraordinarily great, as compared with the corresponding sinkage in their predecessors. This difference in design seriously affected the relative efficiency of the protection given by side armour to the buoyancy and stability of the two types. Eventually it became known that, owing to their great "sinkage" from normal to deep-load draughts, their thickest side armour was wholly under water when the Dreadnoughts and Invincibles were fully laden. When the ships were upright and at rest in still water, the top of the 8-in. side armour was then only about 4 ft. above water. Above the side armour throughout the length, the sides (as usual) were formed of thin steel plates, and were destitute of armour protection. The distribution of side armour in preceding battleships of the Lord Nelson or King Edward classes (*see* Plate 4) is essentially different, and in these vessels the areas of the sides above water protected by armour are much greater than in the new types. In the earlier ships the side armour is carried to the height of the upper deck for a considerable length amidships, where the breadth of the ship is greatest; whereas in the Dreadnought there is no corresponding protection of the upper works. Consequently those portions of the thin sides can be riddled at the longest ranges by projectiles fired from the lightest guns which would be used in fleet actions. Not only were armour-protected areas of the above-water portions of the new types greatly reduced as compared with the corresponding areas in preceding vessels but the disparity was increased by the greater sinkage of the new types from normal to deep-load draught. The maintenance of stability and buoyancy in the Dreadnoughts, when their sides have been battered by projectiles, was thus made inferior to that of their predecessors; and the consequent risks were accentuated by the fact that in most foreign

battleships, built subsequently to the Dreadnought, the earlier disposition of side armour has been retained in association with a powerful secondary armament of quick-firing guns. Reference to the plans of French, German, American, and Japanese battleships in Part II. will illustrate this statement.

Bulkheads and internal armour.

One feature of the protection given to the Dreadnought was officially described in 1906 in the following terms:—"Special attention has been given to safeguarding the ship from destruction from under-water explosion. All the main transverse bulkheads below the main deck are unpierced except for the purpose of leading pipes or wires conveying power. Lifts and other special arrangements are provided to give access to the various compartments." So far as the maintenance of the integrity of water-tight bulkheads was concerned, this was a fresh attempt on well-worn lines; but the former attempts, both in the Royal Navy and in the Mercantile Marine, had been followed by a reversion to the plan of having openings in bulkheads at a low level throughout the engine rooms and stokeholds. This result had followed upon actual experience, and was a consequence of events which showed that, unless free and easy communications were maintained, risks of other accidents, perhaps as serious as the risk of foundering, had to be faced. Naval architects always prefer to avoid openings in watertight partitions, but it is possible to minimise risks by fitting watertight doors which can be closed rapidly and only opened when passage for and aft becomes requisite. From unofficial sources, however, it soon became known that the first sentence in the passage above quoted really included a new departure in the shape of "internal armour," designed to protect the vitals of the ship from injuries resulting from the driving in of *débris* when a submarine mine or torpedo caused an effective explosion. At the time it was considered doubtful by many persons whether or not this system was likely to prove successful. The plan had been previously applied on a large scale in the Cesarewitch and other Russian ships, but in the Dreadnought it was only used to a limited extent. In some of her successors, as will be noted hereafter, it was applied more extensively. Now it has gone out of fashion.

Higher centre of gravity.

In this connection it is proper to note that the weights of heavy guns, gun-mountings, barbette and shell-armour in the Dreadnought are not only much greater than those in earlier battleships, but are placed higher above the normal water-line. It is true that these heights are sensibly lessened by the large "sinkage" from normal to deep-load draughts which occurs in the Dreadnought, but they always remain considerable, and as a consequence the centre of gravity of the Dreadnoughts is relatively higher than that of the earlier types.

This fact has a great influence on the comparative "range of stability" of the two types, and it necessitated an increase in the proportion of beam to draught of water in the Dreadnoughts. For example, the Dreadnought, with a normal draught of water of 26½ ft., has a breadth of 82 ft., and the King Edwards, with 26¾ ft. draught, have a breadth of 78 ft. The Dreadnought must, therefore, have been made a stiffer ship than her predecessors, if she was to equal them in range of stability; and as a consequence her period of oscillation when rolling would prove less, and her quickness of motion greater. This anticipation has been realised; it has been demonstrated by actual trials at sea that under average conditions the Dreadnought and her successors are not equal to earlier types in steadiness of gun-platforms. Long experience has also proved that the heights at which the heavy guns are carried in the pre-Dreadnoughts are amply sufficient to secure the power of fighting these guns efficiently, even in heavy weather. Increase in the height above water at which guns are mounted may obviously be carried too far, having regard to all the consequences involved therein.

The question of speed.

In regard to the value of the higher speeds with which the Dreadnoughts and Invincibles were endowed authorities differ widely. The official view was expressed as follows:—"The greater the mobility the greater the chance of obtaining a strategic advantage. This mobility is represented by speed and fuel endurance. Superior speed also gives the power of choosing the range. To gain this advantage the speed designed for the Dreadnought is 21 knots." The speed trials were made at normal draught, and the speed attained was about 2 knots higher than had been reached by preceding battleships. It has since been demonstrated conclusively that such a difference in speed does not and cannot exercise any important effect in determining the range at which a fleet action will be fought. As to the strategic advantages of superior speed much may be said, but such a discussion lies outside the scope of this paper.

For the Invincibles the maximum trial speed was fixed at 25 knots; the speed attained at normal draught was about 26 knots, showing an excess of about 2 knots above the trial speeds of preceding armoured cruisers. No British armoured cruiser of earlier date had been armed with guns exceeding 9·2 in. in calibre; but the Invincible class was designed to carry eight 12-in. guns in four armoured positions. A few foreign cruisers had been armed with four 10-in. or 12-in. guns, in addition to a good secondary armament. The step taken in the Invincible class was therefore most notable; it involved the creation of vessels which were originally classed as armoured

cruisers but were obviously intended for the line-of-battle, and are now officially designated battle-cruisers. The installation of a heavier armament, concurrently with the provision of propelling machinery of 43,000 H.P.—an increase of 40 per cent. above the engine-power of the swiftest armoured cruisers of earlier date—necessarily involved a large increase in length and displacement for the Invincibles. Their armour protection was weak relatively to that of contemporary battleships, especially in that section of the defence which was devoted to the heavy gun stations. Opinions differed, and still differ, in regard to the policy of building such large and costly cruisers, and of endowing them with very high speed, if they are primarily intended to take part in fleet actions. There is, however, no reason for supposing that smaller vessels could have been produced which would have fulfilled the governing conditions of speed, armament, defence and fuel-supply laid down by the Admiralty for the guidance of the Director of Naval Construction and his staff.

Keeping this fact in view, it will be of interest to consider what were the actual increases of dimensions and displacement of Dreadnoughts laid down in 1905–6, as compared with their immediate predecessors.

Dreadnoughts and King Edwards.

The Dreadnought herself was 65 ft. longer and 4 ft. broader than the King Edwards; in normal draught of water she was nearly identical; in her Navy List displacement (corresponding to the normal draught) there was an increase of 1550 tons. This normal draught, however, does not furnish a true basis of comparison between the types; because (as stated above) the differences between normal and deep-load draughts, or "sinkage," is much greater in the Dreadnought than in the King Edwards or any preceding British battleships. There is official authority for the statement that the Dreadnought when fully laden, complete for sea with fuel, ammunition and stores, draws 31 ft. 6 in.; and the fact can be verified by personal inspection of the vessel. The "sinkage" from normal draught to deep load is, therefore, 5 ft.; the displacement corresponding to the deep draught is about 22,200 tons. For the King Edwards the sinkage is only about one-third as great (about 20 in.) and the deep-load displacement is 17,500 tons. On this basis, therefore, which is obviously a fairer one than comparison between Navy List displacements, the Dreadnought draws 3 ft. more water and weighs 4700 tons more than the King Edward. Instead of being about $9\frac{1}{2}$ per cent. heavier than the King Edward, as would appear from a comparison of the Navy List displacements, the Dreadnought is nearly 27 per cent. heavier when both vessels are fully laden.

As compared with preceding armoured cruisers the increase in length of the Invincibles was 30 ft., and in the Navy List displace ment nearly 2700 tons. In this comparison also there is no allowance made for greater sinkage in the later types, and their deep-load displacements would show an enormously greater excess over those of the earlier vessels, but it is unnecessary to give actual figures.

Perhaps a better idea of the advances in size made in 1905–6 may be obtained by comparing them with the total progress made from the first sea-going British armoured ships (Warrior class, ordered in 1859) to the King Edwards ordered in 1901–2. The Warrior was 380 ft. long and 9200 tons displacement at 26 ft. 9 in. draught; the King Edwards are 425 ft. long, 16,350 tons displacement at the same draught, and 17,500 tons when fully laden; showing an increase in length of 45 ft. and in deep-load displacement of 8300 tons during a period of forty-two years, as against an increase in length of 65 ft. and in deep-load displacement of 4700 tons made at one step in the case of the Dreadnought. There can be but one opinion as to the boldness of the new departure; there were, and still are, great differences of opinion as to its wisdom.

Influence upon foreign construction.

The lead given by Great Britain in the construction of Dreadnoughts was soon followed by other countries, so far as the adoption of a large number of guns of large calibre for the principal armament was concerned. In most cases, however, a powerful secondary armament was also provided and protected by armour. The change in principal armament was accompanied by an increase in speed in most cases, and, for reasons explained above, there was a considerable increase in both length and displacement. Germany, for example, passed in 1906–7 from battleships about 400 ft. long, 73 ft. broad, with displacement of 13,200 tons, at 25 ft. draught, to the Nassau class, which have a length of 450 ft., are 89 ft. broad, and of 18,200 tons displacement, at 26 ft. 9 in. draught. The trial speed of the Nassaus was increased about a knot, and twelve 11-in. guns were mounted in six positions on each ship instead of four 11-in. guns mounted in two positions on their predecessors (*see* Plate 34). The secondary armament was somewhat reduced in power in the Nassaus, but was still of a formidable nature and well protected by side armour, which also strengthened the defence of the stability of the ships when subjected to attacks by artillery.

The first battleships of the United States armed on the single-calibre big-gun principle, were identical in length, displacement, and speed with their predecessors; consequently, a more simple comparison can be made and a better idea formed of the real effect of this change in principal armament. Stated briefly, the Michigan, of

450 ft. in length, 80¼ ft. breath, and 16,000 tons, was capable of carrying an armament of eight 12-in. guns mounted in four armoured positions; in addition she carried twenty-two guns of 3-in. calibre (without armour protection), for defence against torpedo vessels. The Louisiana, which preceded her, was of the same length and displacement, and attained about equal speed on trial; she was armed with four 12-in. guns in two armoured positions, eight 8-in. guns mounted in four armoured turrets, twelve 7-in. guns in an armoured battery; and also carried twenty 3-in. guns, with no armour protection, as a defence against torpedo vessels. Abolition of the 8-in. and 7-in. guns, and the armour assigned for their protection, made it possible, therefore, to double the number of heavy guns. Reference to Plates 71 and 72 will make the comparison better understood, and will show that all the heavy guns were mounted at the middle line of the Michigan and made available on both broadsides. In addition, two of the turrets were placed at a higher level than the neighbouring turrets, and the guns contained therein could be fired directly ahead or astern over the adjacent turret. This disposition of the armament was novel, and American designers showed great boldness in adopting it. The venture was not made, however, until the system had been tested experimentally and proved to be successful. From the foregoing figures it will be noted that the Michigan class were made broader in proportion to draught than the Louisiana, in order to secure satisfactory conditions of stability, and that the armoured area of the sides above water was greatly reduced, thus lessening the protection given to the maintenance of stability when damaged in action. The Michigans have proved less steady gun-platforms than their predecessors, for the reasons stated above.

Dreadnoughts and Post-Dreadnoughts.

The development of British armoured ships since 1905 has taken place along lines, starting, respectively, from the Dreadnought, classed as a battleship, and the Invincible, originally classed as an armoured cruiser, but now officially designated a battle-cruiser. The latter class are superior in speed to battleships, but inferior in armour defence and in the number of their heavy guns. These battle-cruisers, it is said, are intended to act as the swift divisions of fleets; but many high authorities on naval strategy and tactics take exception to the fundamental ideas on which the designs have been based. The value of exceptionally high speed is especially doubted although its attainment has involved great additions to dimensions and cost. In endeavouring to trace the development

Development of classes.

of each of these classes official data will be used as far as possible. Where official data are not available, because of recent endeavours to preserve secrecy in regard to the characteristics of ships building, particulars will be given which are believed to be approximately correct although not officially sanctioned. The appearance of the Navy Estimates for 1912–13 has fortunately added much information and has cleared away some misapprehensions. For purposes of comparison between Dreadnoughts and post-Dreadnoughts it will be assumed, as seems reasonable, that the same amount of "sinkage" has been allowed for in their designs. On this assumption it will not be necessary to consider the relative deep-load draughts and displacements of the ships, as was done above when comparing pre-Dreadnoughts with Dreadnoughts. Normal draughts and Navy List displacements will be used throughout unless otherwise stated.

Larger guns.

The first fact to be noted respecting "post-Dreadnought" battleships is that their maximum speeds on contract trials have been maintained at 21 knots, the estimated speed of the Dreadnought. The number of heavy guns has remained the same as in the Dreadnought—namely ten—and these guns have been mounted in pairs. The disposition of the heavy-gun stations adopted in the Dreadnought was repeated in six of her successors, laid down in the period 1907–8; three later ships (Neptune class) have their heavy guns disposed on a different system (*see* Plate 2); and in subsequent battleships (Orion class) laid down in 1909–10, still another disposition is adopted (*see* Plate 1). The 12-in. guns mounted in the Dreadnought and her three immediate successors were 45 calibres long; the next six post-Dreadnoughts (up to and including the Neptunes) carry 12-in. guns, 50-calibres in length, and of greater weight and power. In the Orion class 13·5-in. guns, 45 calibres in length, were introduced. This type of heavy gun is understood to be still favoured, improvements having been made in the designs of later weapons. Rumours are afloat to the effect that still larger calibres will be introduced. Opinions differ as to the desirability of abandoning the 12-in. calibre, which was adopted about fifteen years ago after full consideration, and in the light of actual experience with 13·5-in. and 16·25-in. guns. During the long period while the 12-in. calibre was in use the designs for successive types of 12-in. guns had been greatly improved, and they had been adopted as the principal weapons mounted in all battleships, except those of the German Navy, where 11-in. guns had been preferred. It is a significant fact that about the time when Germany was moving on to the 12-in. calibre the Admiralty should have adopted 13·5-in. guns. In this paper it is not proposed to deal with the arguments

for or against increase of calibre. The responsible authorities have decided to make that change, and our present task is to show how great has been the effect produced thereby upon the sizes of ships and their cost.

Variations in design.

In respect of armour protection to hulls and heavy-gun stations, the arrangements described for the Dreadnought were practically adhered to in her three immediate successors (Bellerophon class, 1906); they were sensibly modified in the six battleships which followed (St. Vincent and Neptune classes), and were radically altered in the Orion class. Internal armour was employed to a limited extent in the Dreadnought; it was applied much more extensively in some of her early successors, but its use appears to have been abandoned in the latest post-Dreadnoughts.

In the designs of recent battleships there have been unceasing variations from year to year. Each shipbuilding programme has introduced another class, differing in important details from vessels laid down previously and still incomplete. Continual watchfulness of the progress of invention is undoubtedly desirable; improvements of all kinds should be adopted if substantial advantages accrue therefrom; but while these principles are accepted, a review of the numerous changes made during the last seven years makes it difficult to understand why some alterations have been made and why other arrangements have not been adopted sooner, seeing that their general character was well known and their possible advantages had been previously recognised and made use of by other countries. Whatever may be the explanation of the action taken, there has been a continuous and considerable growth of dimensions which will now be briefly illustrated.

The Bellerophon class were laid down about the date when the Dreadnought was first commissioned; their design must have been completed before any experience was gained with the Dreadnought. The feature in which they differed most from her—the extended use of internal armour as a defence against under-water explosions—could not in any case have been influenced by peace-experience with the pioneer vessel had she been completed and tried. It was obviously a feature whose value could only be decided by exhaustive experiments. It was true that French and Russian designers favoured internal armour, but that was no reason for adopting it in British ships unless its value had been demonstrated. Yet it was decided to add considerable weights of internal armour in the Bellerophons, and in consequence their draught of water was made 6 in. greater than that of the Dreadnought, and the displacement was increased by 700 tons. At the date when the use of this

internal armour was ordered events had occurred which threw doubts upon its value; subsequent experiments have confirmed these doubts, and the system has since been abandoned. A more deliberate procedure, based upon thorough and representative experiments, must have secured better results and increased economy.

"Soft-ended" post-Dreadnoughts.

In the next post-Dreadnoughts in point of date (the St. Vincents) a radical change was made in the protection of the extremities. The fact became apparent to every person who visited the ships while they were building, but it was not noticed in most descriptions of the class. One feature in which the Dreadnought had been alleged to be greatly superior to her predecessors was the extension of her side armour to the bow and stern, where the minimum thicknesses were respectively 6 in. and 4 in. Pre-Dreadnoughts had been more lightly protected at the extremities, and advocates of the Dreadnought type were accustomed to describe them as "soft-ended" ships. The Bellerophons resembled the Dreadnought in their armour, but in the St. Vincents, for considerable lengths near the bow and stern, no thick armour was fitted, and the sides were protected by steel-plating from 2 in. to 3 in. thick. In the opinion of the writer this light protection was perfectly justified both in the St. Vincents and in the pre-Dreadnoughts, and it was wise to make the change in the St. Vincents. As a matter of fact, however, the St. Vincent class and later post-Dreadnoughts are as soft-ended as the earlier battleships, which were strongly condemned on the ground that they were inferior in protection to the Dreadnought. The St. Vincents were made 650 tons heavier than the Bellerophons, being 10 ft. longer, 2 ft. wider, and 1350 tons greater in displacement than the Dreadnought. These ships also required machinery of 1500 greater horse-power than the Dreadnought in order to attain the speed of 21 knots.

Armaments.

The Neptune class, designed in 1908, is chiefly notable because of the new departure in the disposition of the heavy-gun stations (Plate 2). The two central turrets are placed *en échelon*, similarly to those of the Invincibles, instead of abreast as in preceding Dreadnoughts; the second turret from the stern is raised so that the guns may fire directly astern over the after turret, and be available over large arcs of training on either broadside, as had been previously arranged in the American battleship Michigan. All the heavy guns could be used on each broadside, the fire of two of them being restricted to comparatively limited arcs of training on one broadside. In this way the Dreadnought disposition of guns was improved upon, and the predominant value of broadside fire was more fully recognised. Fifty calibre 12-in. guns were mounted, and

as the result of various changes the dimensions were raised to 510 ft. in length, 85 ft. in breadth, 20,000 tons displacement (normal draught), with engines of 25,000 horse-power for 21 knots. The extremities were lightly armoured, and the side-armour was carried only to the main deck.

Next in date came the Orion class, the first of which was laid down towards the end of 1909. In these vessels, as already stated, ten 13·5-in. guns were mounted in pairs, and all the stations were placed on the centre-line. Two of the turrets were carried at greater heights than the others; the arrangement of the American battleship Michigan being followed in that respect. All the guns were thus made available over large arcs of training on both broadsides. These features will be better understood by reference to Plate 1, which also illustrates the considerable enlargement of the areas protected by side-armour in the Orion class, and the greater vertical extension of the side armour as compared with preceding vessels of the Dreadnought type. It will be noted that the extremities of the Orion are unarmoured. These changes in armament and armour necessarily involved large additions to the load which the Orion class had to carry, as well as larger requirements for hold-space to accommodate magazines and shell rooms. In consequence, the length was increased to 545 ft. and the breadth to 89 ft. At the normal draught ($27\frac{1}{2}$ ft.) the corresponding displacement is 22,500 tons, and engines of 27,000 horse-power are required to drive the vessels at 21 knots.

Secondary guns.

In the programme of shipbuilding for 1910–11 provision was made for battleships of the King George V. class, some of which are now completing afloat. Official figures for the class have not been published, but it is understood that these vessels closely resemble the Orion class in armour and principal armament. It is alleged, however, that the secondary armament of 6-in. guns will be restored, and that armour protection may be given to these guns. The principal dimensions are said to be:—Length, 555 ft.; breadth, about 90 ft.; displacement, 24,000 tons; horse-power (for 21 knots) 27,000. If these particulars are approximately correct they indicate the magnitude of the growth in dimensions of British battleships since 1905; and they show that, after long controversy, the necessity has been tacitly admitted for that better protection of buoyancy and stability which was recommended as soon as details of the Dreadnought's design were disclosed. If it should prove true that a powerful and protected secondary armament forms part of the design, there will be additional reason for congratulation.

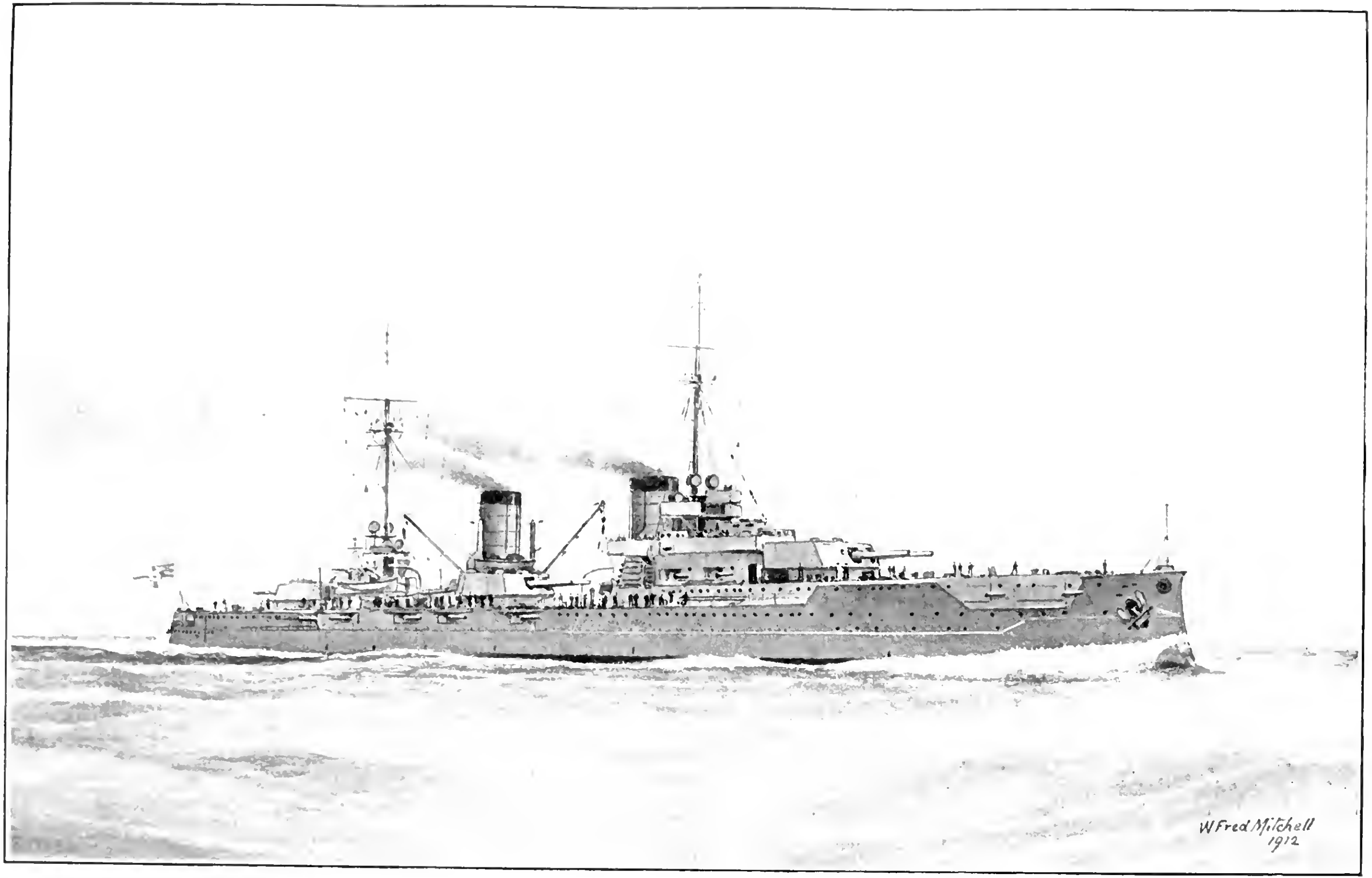
No particulars are available of the designs for four battleships included in the Navy Estimates for 1911–12, and now in early stages

of construction. Past practice, however, makes it probable that there will be a further increase in dimensions, and the question naturally arises—Whereunto will battleships grow? To that question the writer has attempted a reply elsewhere. and will make no answer here.

Battle-cruisers.

Turning to British post-Dreadnought battle-cruisers, a brief statement of their development will suffice. In this connection readers will find Plates 8 and 9 of much interest. The three Invincibles of 1905–6 were followed, early in 1909, by the Indefatigable, which was made 25 ft. longer, about 18 in. broader, and 1500 tons heavier. The armaments were identical: there was little difference in the armour protection, but the two mid-ship 12-in. gun stations (*en échelon*) were placed further apart, and larger arcs of horizontal command were thus secured. The engines had to develop 43,000 horse-power, as against 41,000 horse-power in the Invincibles, the estimated speeds being practically equal.

In the next battle-cruiser, the Lion, laid down within a year of the Indefatigable, there was an enormous advance in size. Official particulars for the vessel are now available, and are in agreement with figures previously published. The principal features are:—Length, 660 ft.; breadth, 88 ft. 6 in.; normal draught of water, 28 ft.; displacement, 26,350 tons; estimated horse-power, 70,000; estimated speed, 28 knots; armament, eight 13·5-in. guns, and sixteen 4-in. guns. The side armour is said (unofficially) to have a maximum thickness of about 9 in. in the region of the water-line, to be about 6 in. thick above this belt, and to rise to the height of the upper deck for a considerable length amidships. The extremities are unarmoured. All the heavy-gun stations are placed on the centre-line, and the eight guns can command large arcs of horizontal training on both broadsides. The Princess Royal is a sister-ship to the Lion; the Queen Mary, launched in March, 1912, is said to have a displacement of 27,000 tons, and it is alleged that the Tiger (just ordered) will be still larger. Whether these reports prove true or not, there is now official authority for the statement that the latest British battle-cruisers surpass contemporary battleships in dimensions, displacement and cost. The Lion is 100 ft. longer than the King George V., and about 2400 tons heavier; her engines can develop on trial more than twice the power, and her principal armament is less powerful to the extent of two 13·5-in. guns. The armour defence although relatively weaker is still considerable; the cost, according to the latest Navy Estimates, excluding guns, ammunition and reserves, is nearly £150,000 greater than that of the battleships, and approaches two millions sterling. The



GERMAN BATTLE-CRUISER "VON DER TANN."

propelling and other machinery are estimated to cost half a million—a sum which closely approaches the cost of first-class British battleships built thirty years before the Lion was laid down. In face of figures such as these, it appears to be well worth considering afresh the opinion expressed by competent authorities to the effect that such high speed is not of great advantage in ships whose primary duty is to serve as units in fleets.

Boilers, engines, and bunkers.

Contract trials of warships extend over a few hours, and are made with everything at its best, engines and boilers in perfect condition, a large force of skilled stokers, and picked coal or oil-fuel. The development of power from a given set of boilers on trial consequently exceeds greatly the power which can be realised over long periods, under working conditions at sea. When a long run has to be made at high speed, the question of trimming and transport of coal from bunkers to boiler rooms also becomes of great importance; whereas on short runs it has little, if any, influence on the development of steam. With oil-fuel, of course, the latter difficulties do not occur. In warships of Dreadnought types, wherein armament requirements must predominate, a number of magazines and shell-rooms for heavy guns have to be placed in the neighbourhood of machinery and boilers. The problem of fuel transport is consequently and necessarily more difficult than it is in swift ocean-going passenger steamers, which are built primarily to perform regular voyages at maximum speeds, and have the central hold-spaces left absolutely free for the accommodation of engines, boilers and bunkers. In these vessels also the provision of boiler power is relatively greater than in warships, the conditions of stoking are easier, and regularity of performance tends to increased efficiency. For these and other reasons, which need not be mentioned, it is well recognised by all who are familiar with the subject that the high trial-speeds of warships do not represent their average sea-speeds over long distances; and that those trial-speeds are not comparable with the average sea-speeds of ocean-going passenger steamers. Persons not well informed have failed to understand these differences and have dwelt upon the value of swift battle-cruisers as commerce protectors, especially against the raids of auxiliary cruisers drawn in time of war from the Mercantile Marine. The idea of employing large and costly battle-cruisers on such a service hardly requires serious discussion; but as the statement has been repeatedly made it may not be out of place to remark that there would be small prospect of success even for the fastest cruisers if employed on the proposed service. Comparing the Lion, for example, with the Mauretania, of the Cunard Line, it is found that the power developed

on contract trial by the former does not differ much from that which enables the Mauretania to cross the Atlantic at an average speed of 26 knots in favourable conditions of weather. The Mauretania is 100 ft. longer than the Lion, of deeper draught and much greater displacement, yet she carries only a moderate load (cargo, passengers and stores) in addition to the large coal supply necessary for the service. Two-thirds of the total length of the Mauretania are given up wholly to propelling and auxiliary machinery, boilers and fuel. The Lion, on the other hand, has to carry a heavy burden of armour and armament, to which there is nothing corresponding in the mercantile steamer; and considerable spaces in the hold are occupied by magazines and shell-rooms. Under these adverse conditions the utmost skill of the naval architect has to be exercised in order to achieve the results above described; but no human skill, under the limitations imposed by the offensive and defensive features of the Lion, can endow her with steaming power—at as high a speed and over as great a distance—equal to that possessed by the Mauretania. Obviously the proper method of dealing with the operations of auxiliary cruisers belonging to other countries is to employ British auxiliary cruisers. Our Mercantile Marine is rich in vessels suitable for the Service, and all requirements can be met, provided wise prevision is exercised and suitable arrangements are made during peace.

Foreign progress.

The Tabular Statements for War-fleets contained in Part II. of this volume give information as to the progress made in foreign navies during the post-Dreadnought period, and it is unnecessary to make more than a brief allusion thereto. It is, however, singular to note that the South American Republics have the largest battleships in process of building at the present time. Two vessels now completing afloat in the United States for Argentina are 585 ft. long, 98 ft. broad, and of nearly 28,000 tons displacement, with turbine machinery of about 40,000 H.P., and an estimated trial speed of 22½ knots. Fully laden, the displacement is 30,000 tons, and the draught will not exceed 30 ft. The armament includes twelve 12-in. guns, twelve 6-in. and sixteen 4-in. This is a long step away from the Dreadnought, and it was made in about five years. Chile is said to be building vessels of equal size in this country; Brazil has built here two Dreadnoughts of nearly 20,000 tons, and proposed to build another of 32,000 tons, but has re-arranged her programme and decided on a vessel as large as the Argentina ships.

The United States are building battleships 575 ft. long, more than 95 ft. broad, of 27,500 tons displacement on 28½ ft. draught, carrying ten 14-in. guns and a powerful secondary battery of 5-in. guns. These ships are exceptionally well defended. For 70 per cent. of the

length the side armour will extend from 8 ft. 6 in. below water to 9 ft. above, and have a uniform thickness of 13½ in., except for a short distance below water to the lower edge. Transverse armour bulkheads of equal thickness will be built across the ship where the side armour ends. No thick armour will be fitted for the remainder of the length near the extremities. The heavy gun stations are to be protected by 13-in. armour. Two strong steel protective decks will complete the hull protection. It is said the total weight of the armour will be about 7000 tons. Germany has the Kaiser class on the stocks or completing afloat—564 ft. long, 95 ft. wide, with 24,100 tons displacement on 27¼ ft. draught, armed with ten 12-in. guns, fourteen 5·9-in. and twelve 3·4-in. The battleship cruiser Moltke last completed is 610 ft. long, 96¾ ft. broad, and of 23,000 tons displacement at 27 ft. draught. Japan, in the Kongo class of battle-cruiser, is closely following the characteristics of the Lion, and has reached 27,000 tons in displacement with heavy guns of 14-in. calibre. It has recently been stated that a battleship of 30,000 tons will next be laid down. France is content with about 23,500 tons.

From these facts it will be seen that all the navies of the world are busily engaged in the game of "going one bigger" in the designs of post-Dreadnoughts, that game having been started with the Dreadnought and Invincibles, and widely advertised as the "winning game." In the matter of secondary armaments, the British lead has not been followed; nor has the system of hull armour adopted in the Dreadnought been widely adopted, the majority of foreign battleships and armoured cruisers having greater proportionate protected areas. In this respect our latest types have come into line with foreign practice, which is really a perpetuation of former British practice in pre-Dreadnoughts. The American disposition of the heavy gun stations and relative heights of adjacent turrets is becoming universal.

Beam and draught.

An outstanding feature in all recent battleships is the greater proportion of breadth to draught of water. It has been explained that this change has been imperatively required in order that the vessels may possess a reasonable range of stability; and it was long ago pointed out that the relative increase of beam must involve quickness of rolling motion and less steadiness of gun-platform. Experience has verified these anticipations. There is good reason for thinking that in their periods of oscillation the largest and latest post-Dreadnoughts closely approximate to the corresponding periods of "converted" ironclads on service in the Royal Navy forty years ago, which ships were notorious for their heavy rolling. The greater dimensions and weights of the modern ships will doubtless tell in

favour of somewhat more moderate rolling in a sea-way; but their relatively small periods of oscillation will render them liable to be set rolling very often, as their periods approximate to the periods of waves occurring in ordinary conditions of sea. The great weight and inertia of these modern ships must also tend to diminish the effect of any practicable bilge keels or other appliances which might be used to secure greater steadiness. Moreover, it is known that these appliances cannot sensibly lengthen the period of oscillation, and it will not be questioned that one of the greatest difficulties in the way of good shooting with heavy guns is to be found in an unduly quick-rolling motion of the platform. This feature of Dreadnought types deserves serious consideration when their relative fighting efficiency is being estimated. Very commonly discussions of this subject proceed as if the conditions which prevail on experimental firing grounds, or polygons, held good also in actions at sea; but it is obvious that conclusions based on such reasoning must be fallacious. Battle-practice results differ sensibly from those obtained on proving grounds, and the fact is not difficult of explanation. When guns of different calibres and weights are fired from a ship, which is not only in motion through the water but is also subject to rolling motion, their accuracy of aim and percentage of hits to rounds fired must be sensibly influenced by these conditions, which differ essentially from the conditions which prevail on a proof-range.

Triple turrets.

Another deduction from recent experience is that when eight or ten heavy guns are mounted in four or five stations on the centre-line of even the longest warships, considerable difficulties have to be faced in regard to convenient working and habitability of bridges, fire-control stations, and other important items connected with the efficient navigation and fighting of the ships. In calling attention to the fact, the writer has not the least desire to criticise; indeed, there can be no doubt that in the designs those arrangements which appeared to be the best possible solution of an extremely difficult problem would be selected and carried out. The really important question, arising in view of what has happened and the costly alterations now being made in certain ships, is whether or not the condition should continue to be accepted that four or five gun stations must be provided for in an individual ship. Austrian, American and Italian designers have adopted triple-gun turrets instead of twin-gun in order to maintain the full number of guns while reducing the number of stations. This change has simplified the designs in many ways, but it yet remains to be proved that triple-gun turrets will be as efficient as twin-turrets in loading and firing the guns, or that this excessive concentration of guns in a single station does not involve

serious risks. Would it not be as well to reconsider the subject on the basis of a sensible reduction in the total number of heavy guns which should be mounted in an individual ship?

Relative Cost of Recent Warships.

At the root of all shipbuilding programmes lies finance. The cost of each unit in the Fleet, as well as the numbers of each class of ship required for the services contemplated as necessary in war, will control the total expenditure. It is the business of the responsible authorities to decide both as to numbers and types of ships to be laid down and to select those combinations of types which will best utilise the total expenditure incurred. The foregoing survey of the last seven years has demonstrated the fact that successive types of battleships and battle-cruisers have been made larger, have carried greater weights of armour and more powerful armaments, and have been propelled by engines of greater power. It would appear certain, therefore, that these successive additions, starting from pre-Dreadnoughts, must have been accompanied by proportionate increases in first cost and cost of upkeep and maintenance; but exact comparisons between types cannot be made on the basis of official figures for either actual or estimated first cost of ships. Great fluctuations have occurred in the condition of the shipbuilding and engineering markets during the last seven years; and these fluctuations have, on the whole, tended to a considerable diminution in the outlay upon Dreadnoughts and post-Dreadnoughts as compared with what their cost would have been if built contemporaneously with pre-Dreadnoughts. In short, no fair comparison of first costs for different types—*quâ* types—can be made unless they are based on *identical prices* for labour, materials, machinery, armour and other items.

Finance and construction.

Some idea of the fluctuations in prices which have occurred, in consequence of special or temporary conditions, will be obtained from the following statements drawn from Parliamentary papers. For the King Edwards (building 1902–3) the cost per horse-power of machinery exceeded £13; for the Dreadnought the corresponding cost was £13·7; for the Neptune (1909–10) it was £10; for the Orion £9·8; for the Lion £7·2. The price of armour per ton has also been sensibly reduced since the King Edwards were built; during the period 1908–10 the cost of steel and other shipbuilding materials was low owing to the depressed condition of the industry. Owing to great developments in the productive power of British warship building, competition not long ago reached a point when eminent firms are known to have made quotations which not merely

included no profit but did not cover the whole of their establishment charges.

Probably the closest comparison which can be made, on the basis of official figures of cost, is to be found in the cases of the Britannia (King Edward class) and the Dreadnought herself, as the two vessels were building in Portsmouth Dockyard at the same time. The Britannia was laid down in February, 1904, but not commissioned until the autumn of 1908; the Dreadnought was laid down in October, 1905 and commissioned in December, 1906. It is well known that the work on the Britannia was delayed in consequence of the preference given to the Dreadnought, and her longer period in construction undoubtedly led to greater cost. Neglecting these disadvantages the figures for first cost stand as follows:—Hull, armour, machinery, gun mountings, and establishment charges: Dreadnought, £1,700,000; Britannia, £1,360,000. Guns: Dreadnought, £113,000; Britannia, £91,000. Totals: Dreadnought, £1,813,000; Britannia, £1,451,000.

These figures, however, do not represent the total costs of the two ships: when complete for sea they also carry ammunition and ordnance stores; while the addition of every ship to the Fleet necessitates a corresponding addition to the reserves of these items of armament. In statements of cost for French, German, and other foreign warships these items are provided for and stated in Estimates. British practice differs, and the cost of guns alone is given against each ship. Foreign practice is undoubtedly fairer in making comparisons between types, especially as the costs of complete armaments in Dreadnoughts are greater than the corresponding costs for pre-Dreadnoughts. On this basis the relative costs would probably stand as follows:—Dreadnought, £2,000,000; Britannia, about £1,550,000. In other words, four Britannias could be produced for about the same total cost as three Dreadnoughts if built contemporaneously and under identical conditions. It has been stated on the highest official authority, and the statement has been frequently reproduced, that the first eight Dreadnought battleships put into commission (up to and including the Neptune) cost to build precisely the same sum as would have built nine King Edwards. On examination of Parliamentary Returns, however, it is found that in this statement no allowance has been made for ammunition, ordnance, stores, and reserves. Moreover, and much more important, is the fact, illustrated above, that the post-Dreadnought types were built under conditions of the shipbuilding industry which made prices run very low; that fact alone vitiates the comparison, and a fairer basis is to be found in the cases of the Britannia and Dreadnought.

By the same official authority the public was informed that the annual upkeep of the eight Dreadnoughts involved a cost £50,000 less than the corresponding cost for nine King Edwards. It was not made clear whether or not allowance was made in this comparison for the excess in annual outlay for maintenance and repairs which would be incurred on the Dreadnoughts. However this may be, and even if the group of King Edwards annually cost £50,000 more than the group of Dreadnoughts—which could be actually produced for the same total sum, including complete armaments—it may be reasonably argued, taking the risks of naval actions into account and the serious dangers arising from under-water attacks, that the increase of numbers of King Edwards which could have been secured for ships of the same cost constituted a sufficient reason for incurring the greater annual cost of their upkeep. Costs of upkeep.

It is most desirable in the public interest that fuller and more accurate statements in regard to the cost of the armaments of H.M. ships should be published than those which are at present available. Corresponding statements appear each year for the expenditure on each ship building, and the cost of separate items—hull and armour, machinery, gun mountings and establishment charges. The cost of guns is also given, but that for the balance of the expenditure on the armaments of individual ships does not appear, and it is essential to any fair comparison of types. In foreign Estimates the information can be found.

The Dreadnought and Invincibles ordered in 1905 were built at a period when prices ruled high and were pioneer vessels of their respective types. According to the Navy Estimates published immediately after their completion, the first costs—including guns, but excluding ammunition and ordnance stores—were respectively £1,813,000 and £1,750,000. If these vessels had been built under the same conditions as their successors of the Orion and Lion classes their costs would have been considerably less According to the Navy Estimates for 1912–13, the Orion has cost £1,919,000, and the Lion £2,068,000 inclusive of guns. These huge figures for the costs of single vessels, which may be put out of action by a single successful under-water attack, may well give pause, and lead to a reconsideration of the policy the prosecution of which has involved such financial consequences within seven years.

W. H. White.

CHAPTER VIII.

The Turco-Italian War.

Its Naval Features.

Last autumn, just as the international difficulties connected with the affairs of Morocco appeared to be in a fair way of peaceful settlement, public attention was abruptly directed to the disturbed relations between Italy and Turkey. The state of tension was caused, according to the Italian official Note, by Turkish opposition to Italian enterprises in Tripoli, and to the ill-usage by the Turks of Italian subjects. For a long time Italy had occupied a privileged position in regard to the Tripolitaine province, and her notorious aspirations towards a more stable establishment of her interests appear to have excited in Turkey a nervous feeling, which found expression in the adoption of restrictions to trading of an irritating character. During the summer the Italian Government had sent to the Turkish Ministers a strong protest against this alleged illtreatment of its people in Tripoli and in some of the Red Sea ports, with a suggestion that it was most desirable remedial measures should be taken without delay. It was hoped that a better feeling might be created by friendly negotiations. Early in September, however, it was reported that the diplomatic correspondence was not proceeding satisfactorily, and several of the Italian newspapers began a vehement campaign for further and more energetic action. The Turkish Press replied by threatening a boycott of Italian commerce and the expulsion of Italian subjects.

Strained relations.

The next step in the controversy appears to have been made by the Ottoman Government, and to have taken the shape of designs intended to strengthen the garrison and defences of the Tripolitaine ports. On September 23 the Italian Consuls in Turkish harbours warned Italian merchant captains that their vessels had better leave; the Italian Government called the reservists of the 1888 contingent to the colours, and a Turkish transport, the Derna, on her way to Tripoli, was "shepherded" by Italian cruisers. On the same day an account was published in some of the European and American newspapers describing the composition of an expeditionary force said to be intended for the occupation of Tripoli; and the steps taken to engage transports, with the date when the force would be despatched

were also mentioned. The Arabs in Tripoli became much agitated, and Europeans began to leave the place. This was immediately followed by the establishment in Italy of a strict censorship upon news telegrams.

On September 25 Italy presented a Note to Turkey complaining of the continuance of this state of unrest, protesting against attempts to rouse the inhabitants of Tripoli to molest Italian citizens, and recommending Turkey to abstain from sending reinforcements to Northern Africa. The Ottoman Government denied that the Europeans were in danger. Then, on September 28, the Italian Government presented its ultimatum to Constantinople. In this document, after recapitulating the grievances of Italian subjects in Tripoli, and intimating the uselessness of further negotiations, the withdrawal by the Porte of its garrison was demanded, and the resolution of the Italians to occupy Tripoli was announced. A reply was required within twenty-four hours. But this being considered unsatisfactory at the Quirinal, a state of war between Italy and Turkey automatically came about at 2.30 P.M. on Friday, September 29, when the twenty-four hours' limit expired.

Italian ultimatum.

From the foregoing summary of the circumstances which ushered in the war—and it would be foreign to the scope of this article to go further into the political causes of the struggle—it will be manifest that there were many signs beforehand of what was likely to occur. The British public, mainly because it had not had its attention prominently directed to the matter by the press, was somewhat taken by surprise, but there is reason to believe that no Government in Europe was without due warning. It was natural to the Turks that they should be caught unawares, for history shows that they have ever been among the last people to accept warnings of the kind. Witness Tchesmé, Navarino, and Sinope. On the other hand, Italy had fully prepared for her enterprise. Not only was the Fleet and Army ready, but, as subsequent events proved, was provided with a complete scheme of operations. Moreover, during the manœuvres of earlier years, the whole plan may be said to have been rehearsed in detail. Landing operations, blockades, bombardments of coast positions, and the like, had been made the object of special exercises of the land and sea forces in co-operation. Pontoons, bridges, and all the necessary equipment of an expeditionary force had been supplied, with horse-brows and other appliances for embarking and disembarking. It was obvious from the first that Italy had profited by the lessons of the wars of recent times, and had directed all her energy towards perfecting her plans for the occupation and annexation of Tripoli.

Warning symptoms.

Limits of war area.

The relative geographical positions of the disputants, as well as the limitations which Italy voluntarily placed upon her action by restricting the war area, made it certain that the first phase of the operations must be wholly naval in its character. Owing to the predominance of the Italian Fleet, and the hopeless inferiority of Turkey's naval resources, it resolved itself into a demonstration of the invaluable character of superior sea-power as an instrument of war. It is quite possible, indeed, that Italy's action was hastened, if not precipitated, by indications on the part of Turkey of a determination, or, at all events, of a desire, to acquire an effective navy. The marked disparity between the naval strength of the two nations simplified the problem with which the Italians were confronted. The primary objective was the naval force of the enemy, and it was necessary to destroy or contain this force so that a military expedition could be passed across the Mediterranean from the Italian ports to Northern Africa without hindrance or molestation. In other words, Italy's strategical need was to arrange the best combinations of her available forces so as to neutralise the numbers and distribution of the hostile fleet, and thus ensure a successful outcome of her operations. Tactically, the problem would have been how best to use these combinations should they be faced by the enemy, but as the narration of events to be given later will show, the Turks solved, this problem for their opponents by the withdrawal of their principal ships to security behind the fortresses in Europe. As a rule, the main object of a naval war must be the destruction of an enemy's fleet, but in this case the same purpose was served when the Ottoman men-of-war thus voluntarily eclipsed themselves. The Turkish force could not even be accused of possessing the character of a "fleet in being," and the potential threat of such a force has had no real influence upon the operations, although, naturally, this has not prevented the Italians from adopting those precautionary measures which were applicable to the circumstances.

Strategical problems.

Although, however, the geographical situation of the Turkish provinces made open-sea communication the essential precedent to any successful attempt at protecting them from invasion, the proximity of the coast of Albania to that of Italy gave opportunity for a naval force of sufficient strength and mobility to menace the Italian trade in the Adriatic by way of reprisals, and might have retarded the despatch of the expedition. No attempt, however, was made to take advantage of this position, and the Italians had little trouble in disposing of the few torpedo craft which, mainly for the Customs prevention service, made their base at Preveza. Otherwise Italy was practically unassailable. This was not the case with Turkey, whose

Ottoman naval unreadiness.

long coastline in the Levant and Red Sea was exposed to attack, while, although the Dardanelles were closed by fortresses and afterwards mined, elsewhere the Turkish ports were ill-protected. It would have been open to Italy either to seize islands like Lemnos or Mitylene in the Ægean Sea, or to make a demonstration off Salonika, but for the apprehension of causing further European complications. Simultaneously with the despatch of its ultimatum to Constantinople, the Italian Government addressed a note to its legations or consulates in the States adjacent to the Turkish frontier, informing them that Italy did not wish to encourage any movement against Turkey in the Balkan Peninsula, and would use her best efforts to prevent anything of the sort happening. Similarly, when Austria-Hungary displayed some nervousness in consequence of the proceedings on the coast of Albania, Italy at once stopped operations in that direction. It seems probable also that the same determination to restrict the war area if possible operated in the use which Italy made of her Fleet, and it may even be that the successful escape of the Ottoman ships from Beyrout to the Dardanelles in the early days of the struggle was due as much to the abstention of the Italians as to the efforts of the Turks. Had a meeting taken place, there can be little doubt as to what the result would have been, and bearing in mind the influence which the so-called "Massacre of Sinope" had upon Western opinion in 1853 the Italians were probably quite satisfied to see the small Turkish squadron take shelter behind the forts at Kum Kaleh and Sid el Bahr.

Tripoli and Cyrenaica.

It is unnecessary in these notes, since they are only intended to sketch the naval operations, to give a detailed description of the province of Tripoli; but a few words may be said about the ports which became the scenes of naval activity. Tripoli, with Cyrenaica, has a seaboard of some 1100 miles, but the coast is very imperfectly charted, and difficulties of access make it unfavourable for the disembarkation of troops. At the same time, the absence of any effective system of fortification and an efficient garrison precluded any successful attempt to oppose a landing. It was in every case bad weather which caused delay to the Italians in their attempts to throw men on shore. The principal seaports are Tripoli, Benghazi, and Derna, while there is also at Marsa Tobruk a harbour, which is capable of considerable development. It affords perfect shelter in five to seven fathoms from all winds excepting those from the south-east to east. It is, moreover, of large extent. The harbour of Tripoli affords fairly good anchorage, but landing is not easy when strong northerly winds prevail. The defences of the place consisted of two or three old masonry forts and an earthwork, with

armaments mostly of obsolete guns. Derna and Benghazi are open roadsteads.

The Italian Fleet.

Italian naval development.

Since it was last engaged in a maritime conflict, the Italian Navy has undergone, in common with other fleets, a development which has not only maintained, but improved its relative position, and as Captain Osvaldo Paladini said in the *Naval Annual* for 1906, it is a powerful factor in military and political affairs. This is the result of energetic and far-seeing administrative work, and especially of the encouragement by the Government of the shipbuilding and manufacturing industries of Italy to develop their resources for naval purposes. The work of the late Benedetto Brin, as Minister of Marine, was particularly valuable in this connection, and it was due to him that in 1885 a law was passed for subsidising shipbuilders and shipowners in proportion to the tonnage and engine power of ships built in Italian yards with Italian material. Also that English firms were induced to co-operate with those in Italy for the production of propelling machinery, guns, armour, etc. The benefit of the co-operation of firms like Armstrong and Vickers is readily acknowledged—as has been said by an Italian writer: "The happy results of which Italy is to-day so proud are due almost entirely to Brin's idea of calling in English capital and English industrial organisation to co-operate with Italian workmanship." As regards relative position, the Italian Navy now stands fourth among the navies of Europe, with a strength of something less than one half that of France and one-third that of Germany. Of its twenty-one armoured ships, ten are cruisers, and all have some novel features which mark them out from contemporary vessels in other Services. Italian constructors, in fact, have never made it a rule to follow simply the building policy of any other country, but have asserted their originality in some remarkable designs of their own.

The Battle Fleet at present includes eleven battleships, all completed during the last twenty years, and of which the most modern are the four ships of the Roma class. These vessels are notable for their high speed of 22 knots, and the inclusion of two instead of four 12-in. guns in the main battery—the price of 4 knots speed. The latter reduction was held to be partially compensated for by the increase of the secondary battery from four to twelve guns of 8-in. calibre. The Roma type was referred to with approval by Admiral Sir John Hopkins in his lecture, at the Royal United Service Institution in February, 1902, upon the question, "Is a Second Class or Smaller Battleship Desirable?" He pointed out

that at that time only seven of the forty-two first-class cruisers built or building in European navies were superior to the Roma in speed, while her merits as a reinforcing ship were very great. It was not until five years later that this idea of powerful cruisers as a fast wing of a battle fleet was accepted by the British Admiralty for the Invincible class, which speaks much for the foresight of Italian designers. The two slightly larger ships of the Benedetto Brin type, laid down three years earlier, are almost fast battleships, being designed for 20 knots, as compared with the 19 knots of the British Duncans and the 18 knots of the Formidables of similar date, but they carry a less powerful secondary battery. These six ships form a very efficient striking force for the Italian Navy.

Types of ships.

Of the five older battleships, two carry 10-in. guns in their main battery and the remaining three guns of 13·5-in. calibre, like the British Royal Sovereigns, but all have a good speed. There is not the marked difference between Italian battleships and armoured cruisers that exists in the British Navy, for while the former have high speed, usually associated with the cruiser class, the latter also carry heavier guns than are to be found in any other pre-Dreadnought cruisers except the Russian Rurik, the Japanese Tsukuba, and the American Tennessee classes. Of the ten Italian armoured cruisers, seven not only carry 10-in. guns but 8-in. or 7·5-in. guns as well. The predominant characteristics of Italy's armoured fleet therefore seem to be high speed and heavy gun power, and the principles underlying design were well expressed by Captain Paladini when he said that it was necessary for Italy to prepare a force which could be applied to the defensive strategy most suitable to a nation which has many populous coast towns to defend. Therefore it was obvious that the vessels most suitable must be of high speed, well armed and protected, and sufficiently independent, and Italian naval constructors have never lost sight of these qualities amid all the rapid changes in naval construction due to the progress of metallurgy and ballistics.

Naval material.

In unarmoured cruisers for commerce protection, or for scouting duties and the like, Italy is not so well provided as some of her neighbours. She has no first-class protected cruisers, none of the second-class under twenty years of age, and only eight of the third-class, but she has recently begun to build scouts of 3380 tons. The Italian torpedo flotilla is not only strong numerically, but particularly efficient, thanks chiefly to the enterprise of private firms at Naples and elsewhere, although a few of the boats were obtained in Germany. Nor has submarine construction been neglected, and, leaving out of account the Delfino of 1894, there are ten boats available to form a submarine division if necessary,

though it does not appear that much use was ever intended to be made of the submarine during the war.

Personnel and organisation.

The *personnel* of the Italian Navy is well organised and trained, and the Government has the advantage in this connection of a considerable maritime population upon which to draw for its naval seamen. It consists of 49,389 officers and men, with a small reserve of some 4000. The seamen are excellent fighting material, and only a part of the annual draft provided by the conscription system is required, but the remainder is liable to be called upon in case of war. As a matter of fact, certain grades of naval reservists were called to the colours. Petty officers are obtained from those who join as boys and form a continuous service force.

The effectiveness of organisation at the Ministry of Marine was illustrated by the smooth and noiseless manner in which the mobilisation of the Fleet was carried out. The chief of the department is usually an admiral, but he is also a member of either the Senate or Chamber, and is fully responsible to Parliament. A civilian under-secretary and a rear-admiral with the title of "general secretary" assist the Minister of Marine in matters of detail and routine. There are also two advisory bodies, the Superior Council and the Committee of Design. The Executive Bureaux include those dealing with the *personnel*, with shipbuilding, with naval ordnance, and with the Mercantile Marine. To the existence of this last-named bureau, and the fact that the Italian Mercantile Marine is controlled from the same department as the Navy, may be due the promptness with which the transports were taken up and utilised to convey the troops to the African coast.

Naval bases.

For the purposes of naval organisation, the coast is divided into three great maritime departments, each under the prefectship of an admiral, with headquarters at Spezia, Naples, and Venice. Spezia is the most important of the naval bases. It has a well-equipped dockyard and arsenal, a splendid harbour, and is strongly fortified. Naples, with the building yard at Castellammare, is second in importance, but it has been suggested that Taranto should be substituted for it as the more suitable base for naval purposes. Taranto has a dockyard, which has recently been enlarged and improved, and the roadstead has been protected by fortifications, while it is in contemplation to complete a breakwater for the purpose of giving security to the ships lying in the outer anchorage. The third base is at Venice, which is also provided with a large and well-equipped dockyard, and is protected by modern forts and artillery. The principal secondary bases of Italy include the island of Maddalena, on the north coast of Sardinia, Brindisi, in the

The Italian Fleet.

Name.	Displacement. Tons.	Date.	I.H.P.	Nom. Speed. Knots.	Armament.
		BATTLESHIPS.			
Roma	12,425	1907	21,968	22	Two 12-in. Twelve 8-in.
Napoli	12,425	1905	19,000	22	
Regina Elena	12,425	1904	19,300	22	
Vittorio Emanuele III.	12,425	1904	19,300	22	
Benedetto Brin	13,207	1901	20,400	19·5	Four 12-in. Four 8-in.
Regina Margherita	13,207	1901	20,660	20	
Ammiraglio di Saint Bon	9,645	1897	14,400	18·3	Four 10-in. Eight 6-in.
Emanuele Filiberto	9,645	1897	13,630	18·3	
Sicilia	13,085	1891	16,900	19·2	Four 13·5-in. Eight 6-in.
Sardegna	13,640	1890	17,500	20	
Re Umberto	13,825	1888	19,500	19	
		ARMOURED CRUISERS.			
San Giorgio	9,680	1908	19,595	22·5	Four 10-in. Eight 7·5 in.
San Marco	9,680	1908	23,700	22·5	
Amalfi	9,980	1908	20,500	23·6	Four 10-in. Eight 7·5-in.
Pisa	9,980	1907	20,812	23	
Francesco Ferruccio	7,234	1902	13,580	20	One 10-in. Two 8-in.
Varese	7,234	1899	13,840	20	
Giuseppe Garibaldi	7,234	1899	14,710	20	
Carlo Alberto	6,396	1896	12,230	19·2	Twelve 6-in. Six 4·7-in.
Vettor Pisani	6,396	1895	13,250	20	
Marco Polo	4,511	1892	10,700	19	Six 6-in. Ten 4·7-in.
		PROTECTED CRUISERS.			
Coatit	1,292	1899	7,500	21	Four 4·7-in.
Agordat	1,292	1899	8,550	22	Four 4·7-in.
Puglia	2,498	1898	7,400	20	Six 4·7-in.
Calabria	2,452	1894	4,000	16·4	Four 6-in. Six 4·7-in.
Elba	2,689	1893	7,470	17·9	Two 6-in. Eight 4·7-in.
Liguria	2,255	1893	7,100	19·6	
Umbria	2,255	1891	7,000	18·8	
Etruria	2,255	1891	7,590	19·8	
Lombardia	2,245	1890	6,840	17	
		TORPEDO VESSELS.			
Caprera	833	1894	3,900	21	One 4·7-in.
Minerva	833	1892	3,880	21	
Urania	833	1891	4,400	20	
Iride	833	1891	3,850	19·6	
Aretusa	833	1891	3,800	20·7	
		TORPEDO-BOAT DESTROYERS.			
10 boats	365–400	1906–10	6,000	30	Four 12-pdr.
6 boats	325	1901–4	6,000	30	Five 6-pdr.
6 boats	315	1899–01	6,000	30	—
1 boat	293	1898	4,730	28	Five 6-pdr.
		TORPEDO-BOATS.*			
24 boats	214	1905–8	3,000	25	—
4 boats	203	1905–6	3,000	25	—
1 boat	160	1907	2,200	25	—
7 boats	149	1888–99	2,000	25	—
		SUBMARINES.			
6 boats	148–182	1905–8	600–900	10–15	—

* Excluding 46 second- and third-class boats, of from 38 to 78 tons, launched 1881–1895.

Adriatic, Genoa, Ancona, and, more recently, Augusta, on the east coast of Sicily. All these places are well protected, afford facilities for the fitting and repairing of ships, and have been used during the war. At the last-named place the repair ship Vulcano was stationed, some 14,000 tons of coal had been stored there, and thither the vessels returned from the coast of Africa to replenish their supplies of fuel, stores, etc.

The Turkish Fleet.

Effective naval force.

The outbreak of war found the Turkish Navy quite unprepared to prevent the success of the Italian military expedition or to do anything but act strictly on the defensive. Her past experience of the use of sea power should have convinced Turkey of her need of an adequate Fleet, but lack of means prevented her maintaining one on the former scale. She had effective the two ex-German battleships, Kheyr-ed-Din Barbarossa and Turgut Reis, purchased in August, 1910, for the sum of £900,000, which were obsolete according to European standards, although serviceable and in good condition by reconstruction and reboilering. These were the only vessels at all capable of being used against the Italian armoured fleet of twenty-one battleships and cruisers. In addition, Turkey had two protected cruisers, the Hamidieh and Medjidieh, built respectively by Armstrong, of Elswick, and Cramp, of Philadelphia, and launched in 1903. The former of these useful ships was at Spithead in June last for the Coronation Naval Review, under the command of Commodore H. Sermed Bey. The only other modern vessels were torpedo craft. There were two torpedo gunboats, the Berk-i-Satvet and the Peik-i-Shevket, both launched at the Germania Yard, Kiel, in 1906, and completed in the following year. They may be described as glorified destroyers, without a destroyer's speed, being only designed for 22 knots. The torpedo-boat destroyers numbered ten of modern type, four being the boats purchased from Schichau, of Elbing, in 1910, similar to those constructed by the same firm for the German Navy; four of French manufacture, launched at the Creusot Works, Bordeaux, in 1907–8, and two older vessels, the Berk-Efshan and Tajjar, launched at Kiel in 1894. There were also fifteen torpedo-boats effective. This total included eleven Ansaldo boats, seven of which, the Angora, Urffa, Antalia, Tokat, Deradj, Kulahia, and Mossul, were launched in 1906; two, the Eliagot and Ac-Hisar, in 1904, and two unnamed boats in 1901. The remaining four torpedo-boats were of French design—the Hamid Abad, Sultan Hissar, Sivri Hissar, and Timur Hissar—and were launched at Bordeaux in 1906.

The Turkish Fleet.

Name.	Class.	Where built.	Displacement.	Date of launch.	Speed.	Armament.
			Tons.		Knots.	
Kheyr-ed-Din Barbarossa	Battleship	Wilhelmshaven	9,901	1891	17	6 11-in., 8 4·1-in., 8 3·4-in.
Turgut Reis.	Battleship	Stettin (Vulcan)	9,901	1891	17	
Messoudieh.	Battleship	Thames; Genoa (reconstructed)	9,120	1874; 1902	17·5	2 9·2-in., 12 6-in.
Mouin-i-Zaffer	Battleship	Blackwall.	2,330	1869	12	4 6-in.
Awni-Illah.	Battleship	Genoa (reconstructed)	2,314	1903–06	12	4 6-in.
Hamidieh	Pro. Cruiser	Elswick (Armstrong)	3,800	1903	22·2	2 6-in., 8 4·7-in.
Medjidieh	Pro. Cruiser	Philadelphia (Cramp)	3,432	1903	22·2	
Berk-i-Satvet; Peik-i-Shevket	T.G.B.	Kiel (Germania)	740	1906	22	2 4-in., 6 6-pr.
Jadighiar-i-Millet; Muavenet-i-Millet; Mahabet-i-Watan; Nuhum-i-Hamijet	T.B.D.	Elbing (Schichau)	610	1909	35	2 3·4-in.
Samsoun; Basra; Tassos; Yar-Hissar	T.B.D.	Bordeaux (Creusot)	280	1907–8	28	1 9-pr., 6 3-pr.
Berk-Efshan; Tajjar	T.B.D.	Kiel	270	1894	25	6 1-pr.
7 vessels	T.B.	Sestri Ponente (Ansaldo)	165	1906	27	2 1-pr.
4 vessels	T.B.	Bordeaux (Creusot)	97	1906	26	2 M.
2 vessels	T.B.	Sestri Ponente (Ansaldo)	165	1904	27	2 1-pr.
2 vessels	T.B.	Sestri Ponente (Ansaldo)	145	1901	26	2 1-pr.

British naval officers.

Turkey had therefore an effective force whose aggregate displacement amounted to no more than 34,777 tons, or about one-seventh of the effective tonnage of the Italian Fleet. To this position she had been brought by long neglect of her sea forces and also by mismanagement on the part of those responsible for naval administration. It was not only that insufficient money was voted for the Navy, but it was expended on the upkeep and repair of obsolete and useless vessels, instead of being used to build newer and better ships. A change of policy came about three or four years ago, when the Government made application for the services of a British admiral and staff to undertake the reorganisation of the Fleet, and Rear-Admiral Sir Douglas Gamble was appointed in December, 1908, for a period of two years. The staff lent to assist the Admiral included Lieutenants A. P. Le C. Faught (N.), F. L. Tottenham (G.), A. L. Gwynne (T.), Engineer-Lieutenant L. R. Croisdale, and Assistant-Paymaster R. F. Durman. The efforts of these officers were so far successful that the Turkish Fleet carried out a four months' cruise in

the summer of 1909, and the improved organisation and discipline effected within so short a time were the subject of general commendation. Admiral Gamble resigned his position as Naval Adviser to the Turkish Government early in 1910 on the ground of ill-health, and was succeeded by Rear-Admiral H. P. Williams, whose appointment was announced on April 13. The only other changes in the British staff have been the appointment of Lieutenant L. D. I. MacKinnon for gunnery duties, in the place of Lieutenant Tottenham, and Engineer-Lieutenants W. W. Reed and G. W. Le Page, for engineering duties, in place of Engineer-Lieutenant Croisdale, while Naval Instructor H. H. Holland has also been lent to the staff in addition, which consists (March, 1912) of seven members, including the Admiral. Lieutenant Gwynne returned home in 1911. On the outbreak of war the British Government consented to these officers continuing in the service of the Ottoman Navy, but their duties were limited to the shore, and were in no way connected with the operations of the war. In addition to these measures for putting the existing fleet in order, steps were taken to construct new ships, and contracts were placed in May, 1911, for the building of two Dreadnoughts in England. These ships were presumably part of the programme reported to have been drawn up by Sir Douglas Gamble in 1910, and adopted by the Cabinet, which included also three cruisers and ten destroyers.

New shipbuilding.

The Dardanelles defences.

Turkey does not possess anything effective in the way of a naval base, although she has a dockyard at the Golden Horn. With the exception also of the Dardanelles, it is unlikely that any of her ports are effectively fortified. In the batteries at the Dardanelles there are from twelve to fifteen 12-in. guns, but these are much exposed, and have a very restricted arc of fire and indifferent loading arrangements. Most of the other guns, of which there are many in the forts, are of an obsolete nature, and practically useless against modern armoured ships. After the war began the Dardanelles and some of the other ports were mined.

Narrative of the Operations.

The Naval Mobilisation.

Owing to the strict exercise of the censorship by the Italian authorities after September 23, information about the mobilisation and subsequent movements of the Navy and Army was sparse and fragmentary. The concealment of trustworthy news led also to the publication of much spurious and misleading matter. This account of events, therefore, must not be regarded as exhaustive, although care has been taken to make it as full as the circumstances would

permit. It has been compiled mainly from reports which appeared in Italian, German, and English newspapers and magazines, supplemented by official despatches, personal narratives, and private letters.

At the outbreak of hostilities on the afternoon of September 29, the Italian Battle Fleet, with its attached flotillas, had been organised in two squadrons, each of two divisions, and there were also three independent groups—the training division, the division operating on the Albanian coast, and that stationed in the Red Sea. The composition of these forces, so far as can be discovered, was as follows:—

Italian Fleet organisation.

FIRST SQUADRON.

First Division.

Commander-in-Chief—The Late Vice-Admiral Aubry.
Battleships—Vittorio Emanuele III., Regina Elena, Roma, Napoli.
A Flotilla of four Destroyers.

Second Division.

Rear-Admiral Presbitero.
Armoured Cruisers—Pisa, Amalfi, San Marco.
Third-class Cruiser—Agordat
A Flotilla of four Destroyers.

SECOND SQUADRON.

Third Division.

Vice-Admiral Faravelli.
Battleships—Benedetto Brin, Regina Margherita, Emanuele Filiberto.
A Flotilla of four Destroyers.

Fourth Division.

Rear-Admiral Thaon de Revel.
Armoured Cruisers—Giuseppe Garibaldi, Varese, Francesco Ferruccio.
Third-class Cruiser—Coatit.
A Flotilla of four Destroyers.

Training Division.

Rear-Admiral Borea Ricci.
Battleships—Sicilia, Sardegna, Re Umberto.
Armoured Cruiser—Carlo Alberto.

Adriatic Division.

Rear-Admiral the Duke of the Abruzzi.
Battleship—Ammiraglio di St. Bon.
Armoured Cruisers—Vettor Pisani, Marco Polo.
Third-class Cruiser—Lombardia.
A Flotilla of five or six Destroyers.
A Flotilla of six or eight Torpedo-boats.

Red Sea Division.

Third-class Cruisers—Piemonte, Aretusa, Puglia, Calabria, Liguria.
Despatch Vessel—Stafetta.
A Flotilla of six Torpedo Boats.

Mobilisation arrangements.

Nearly all of these vessels were in readiness for instant action. The ships in full commission were, on September 1, distributed at the various arsenals in the south awaiting orders, and when, two days later, the instruction to mobilise arrived they were prepared to proceed to their war stations, and several left for Augusta at once. The naval reservists of the youngest four classes, 1884–87, were instructed to join within three days, and those men who were to have joined on October 1 were instructed to report themselves forthwith.

The armoured cruiser San Giorgio was lying damaged at Naples, she having recently sustained injury by striking a rock at Posillipo, but she was the only vessel of the active fleet unfit for service. The battleships Regina Margherita and Regina Elena and the armoured cruiser San Marco were undergoing repairs estimated to take from eight to fourteen days. The battleships Sicilia, Re Umberto, St. Bon, and Emmanuele Filiberto, with the armoured cruisers Carlo Alberto and Marco Polo, had reduced complements to fill up, and in order to complete for active service with reservists they required eight days. All the ships, however, with the exception of the Regina Elena and Regina Margherita, were ready to leave on October 1, and those two vessels by October 5.

The mobilisation of the Fleet was thus smoothly, and without attracting much notice, carried out. The success which attended the operation of placing the Navy on a war footing and the secrecy in which its execution was enveloped are high testimony to the efficient working of the naval administration. By the excellence of the plans, the smartness with which the Fleet moved, and the effectiveness of all the measures taken immediately on the declaration of war, the command of the sea was practically secured before an attempt was made to despatch a single transport from harbour.

Defence of the coast.

At the same time steps were taken for the defence of the coast and commerce. On September 23, Taranto and Brindisi had their forts mobilised, and Venice was put on the same footing on October 2. On the coast, from Ancona to Cape Santa Maria di Lucia, the coast-guard stations were occupied and coast defence companies placed for observation. Certain lights were also extinguished for a time. Also in the colony of Erythrea the garrison was increased by a mobilisation of the native levies, and the Red Sea naval division prepared for action.

In Turkey, on the other hand, nothing appears to have been done

by way of preparing for the war, and it does not seem to have been realised that Italy would take prompt measures to use her crushing naval superiority as soon as the time limit in the ultimatum expired. No concentration of naval force took place. There were some small craft in the Red Sea, a training squadron in the unprotected harbour at Beyrout, several gunboats scattered along the coast of Asia Minor, or in the ports of Salonica and Smyrna, while on the coast of Albania there were a few torpedo vessels. It was from the ports in Epirus and Albania that an attempt might have been made, with some hope of success, to harass and delay the military expedition to Tripoli, while fast blockade-runners were used to throw men and arms ashore in the threatened province. To have undertaken such an enterprise, forethought was necessary, some adequate defence of the port or ports chosen as a temporary base was required, and a suitable squadron should have been assembled for the purpose. But nothing of the kind was attempted, and later on the difficulties of landing on the coast in Tripoli, and the speedy manner in which the Italians seized all the ports, foredoomed any plan for effectively helping the garrison in this way to failure.

Turkish naval distribution.

The squadron at Beyrout consisted of the battleships Kheyr-ed-Din Barbarossa (ex-Kurfürst Friedrich Wilhelm) and Turgut Reis (ex-Weissenburg), the cruisers Hamidieh and Medjidieh, and five destroyers. The battleships and cruisers left the harbour on September 28, and steamed towards the coast of Cyprus, being at the time without information as to the imminence of war. Intelligence of the outbreak of hostilities was received two days later, and taking course between Mitylene and the mainland, the little force arrived safely in the Dardanelles at 4.30 P.M. on Sunday, October 1. The five destroyers arrived on the 3rd. Nothing was seen of the enemy by the squadron, and although Italian cruisers or destroyers were reported on September 30 from no less than five signal stations in the Ægean Sea, it does not appear that any serious attempt was made to intercept the Turkish ships. These went up to Constantinople until October 16, when with some other vessels they returned to the Dardanelles, and the fleet there was reported, about October 22, to be composed of the battleships Turgut Reis, Kheyr-ed-Din Barbarossa, and Messoudieh, the cruisers Hamidieh and Medjidieh, six destroyers and two torpedo-boats. At the same time there were in dockyard hands at the Golden Horn the battleship Assar-i-Tewfik, the gunboat Berk-i-Satvet, two destroyers and four torpedo-boats. With the exception of a guardship or two and a few gunboats and torpedo craft outside the Dardanelles, this was believed to be the total effective naval force of Turkey.

Italian plan of operations.

Immediately on the outbreak of war, the Italian naval plan of operations revealed its three-fold character. While one division of the force dealt with the small vessels which from the Turkish ports of Albania and Epirus menaced the Adriatic, another swept the Ægean Sea eastward to the Syrian coast for the main body of the Turkish Fleet, and yet a third proceeded to make good the blockade of the Tripolitaine littoral. These operations were undertaken to secure the safety of the Italian lines of communication, shipping, and coast towns from attack. As a result, within a few days the Turkish torpedo boats at Preveza and other ports in the lower Adriatic had been destroyed or captured, the Turkish men-of-war on the Syrian coast had disappeared behind the forts at the Dardanelles, and the blockade of the North African coast from the frontier of Tunis to that of Egypt had begun. Thus at the very outset communication between Turkey and the provinces which are her last strongholds in Africa was effectively severed, and the Italian Commander-in-Chief was enabled to report that the transport of the military expedition might be carried out without fear of interruption.

Operations in the Adriatic.

The first shot of the war appears to have been fired on the morning of September 30, within a few hours of the expiration of the ultimatum. It was to Vice-Admiral the Duke of the Abruzzi that the routing out of the Turkish torpedo craft on the coast of Albania was entrusted. An advanced detachment of his squadron, consisting of the Marco Polo, with other cruisers, and some destroyers, had left Taranto on the morning of Friday, September 29, and were already on the Albanian coast when the ultimatum expired. It was understood that the Turkish torpedo craft were assembling at Preveza, a port at the southernmost point of the province of Yanina, at the entrance to the Gulf of Arta, with the intention of harassing Italian commerce, and the Duke was therefore instructed to take measures calculated to prevent anything of the kind. Reporting the first engagement, he said in his despatch, dated from the Vettor Pisani, his flagship:—

Action off Preveza.

I arrived off Preveza this morning (September 30) and established a blockade. At three o'clock the officers in command of the flotillas signalled that two Turkish torpedo-boats had left Preveza in succession.

One flotilla gave chase to the first boat, which tried to escape to the north, and after a brief exchange of shots the Turkish boat made for the shore, where she stranded after catching fire, and remained *hors de combat*.

The second Turkish torpedo-boat, which was pursued by two destroyers, returned at once to Preveza without sustaining any damage.

I have telegraphed to the officers concerned my satisfaction with the way they carried out the manœuvre.

The vessel which was set on fire and destroyed was reported later to be the Tokat, and the vessel which escaped into port, where she was afterwards sunk, the Eliagot. According to a more detailed report of this and a subsequent action which appeared in a Milan paper, Captain Biscaretti, who commanded a section of the destroyer flotilla, arrived off the coast north of Preveza on the previous night. A lieutenant named Pananzi landed disguised as a peasant, and from the summit of a hill, with the aid of his glasses, was able to see inside the harbour of Preveza and to distinguish the position of the Turkish vessels, which appeared to be about to leave. He hurried back with his report, and shortly afterwards the two Turkish boats appeared, and were chased, with the result as stated in the Duke's despatch. Captain Biscaretti then approached the port, which one of the destroyers, the Corazziere, entered, while the other, the Artigliere, remained outside in reserve. It was not until the Corazziere had seized a small vessel in the harbour and taken her in tow that the forts opened fire. In the action that ensued a Turkish torpedo-boat was sunk, and the Italians retired without being harmed.

The Ministry of Marine also published a despatch, dated from Cape Santa Maria di Lucia, as follows:—

> The destroyers Artigliere and Corazziere sank a destroyer and a torpedo-boat near Preveza this morning. The Corazziere is on her way to Taranto escorting a captured yacht. The destroyer Alpino has captured a steamer with a Greek crew, which was on her way from the north to Preveza and had on board five Turkish officers and 162 soldiers, besides a large quantity of munitions of war and grain. We have sustained no casualties in men or ships.

The Turkish boats stationed on the coast of Albania are believed to have been of the Ansaldo and Creusot types, and not destroyers. These boats varied in length from 116 ft. to 165 ft., and carried a very small armament in addition to their torpedoes. Their principal duty was confined to the prevention of smuggling. Other boats were also reported as destroyed off Gomenitza, Murta, and Durazzo; of the six or eight believed to be on the coast, apparently all but one were accounted for—the Antalia. The name of the captured yacht was given as the Trablusi Gharb.

Capture of transports.

On the same day as the occurrence off Preveza, but further to the northward, another transport was reported to have been captured by the Marco Polo and her flotilla. Later on a semi-official note stated that the Turkish officers captured on board the two transports Sabah and Newa were to be released on parole. Several minor successes were achieved by the Duke's division, but a report that the Italians contemplated landing in Albania aroused a feeling of irritation in Austria-Hungary, and out of deference to public opinion in that country instructions were given to recall the patrols on October 6,

and the last capture reported appears to have taken place on the following day. Other plans were then adopted for the protection of the Italian coast and Italian shipping from Turkish attack. In connection with the capture of the transports, a naval prize court was established.

After clearing the Albanian ports, the Duke of the Abruzzi took the greater portion of his force on to the Ionian and Ægean Seas, and towards the end of October was reported to be cruising between Cerigo and Crete.

Work of the First Squadron.

The duties of the First Squadron and its attached flotilla of destroyers, under the command of Admiral Aubry, included sweeping operations on the Macedonian and Syrian coasts, with other precautionary measures intended to secure the safety of the Italian lines of communication against attack from the direction of the Ægean or the Levant. The wide area covered by these movements was indicated by the almost simultaneous reports during the first few days of hostilities of Italian vessels sighted off Smyrna, Salonika, Dede Agatch, Thasos, Mitylene, Chios, and other places.

Marsa Tobruk

The First Squadron had also other work to accomplish on the Cyrenaican coast. With his flag in the Vittorio Emanuele, the Admiral, after having satisfied himself that he had little to apprehend from Turkish naval activity, appeared on October 4 off Marsa Tobruk, and under cover of his guns landed a brigade of 500 seamen and marines. The small Turkish garrison was unable to offer much resistance and was overpowered, and until the arrival of the troops on October 10 a naval brigade remained in occupation of the place.

This harbour has proved invaluable to the Italians. It was at once made a temporary base for the vessels operating to the eastward, and later was used as a coaling depot by the blockading ships instead of their returning to Taranto or Augusta to replenish fuel and stores. The advantages of Tobruk, which had been overlooked or neglected by the Turks, were thus early recognised and utilised by the Italians. The Admiral's expedition was accompanied by a transport carrying a large quantity of stores and material for the establishment of a temporary base. This material had been tested during the naval manœuvres in 1910. As the water-supply was bad a distilling and tank ship was stationed in the port, as well as a vessel fitted up with machine shops, etc., for undertaking repairs. Forts and earthworks were thrown up for the protection of the place against land attack, and a wireless telegraph station installed. On more than one occasion after the military occupation the place was attacked by the

enemy, but the assaults were repulsed by field-artillery fire and the guns of the Fleet. In one of these affairs in October, when the troops of the garrison, reinforced by two companies from the warships, were driving off the enemy, the Italian Navy lost a lieutenant and a doctor, while several seamen were wounded.

Some of the ships of this division visited Derna, to the westward of Tobruk, on October 8, but, it was said, merely to give notice of the war and to take away Italian subjects. This visit, and others of the same character, gave rise to premature rumours of bombardment. It was not until October 16 that the second division of the First Squadron appeared off the place and summoned it to surrender. As the Turks refused to comply with the demand, the ships proceeded to bombard and destroy the barracks and trenches. Landing-parties were then despatched, but the sea was so rough that it was deemed prudent to recall the troops. During the whole of the next day the weather prevented any landing operations, but on October 18 troops were landed from the Fleet, the town was occupied, and the Italian flag hoisted. Derna.

The Occupation of Tripoli.

To the Second Squadron, under the command of Vice-Admiral Faravelli, was entrusted the occupation of the town of Tripoli and the neighbouring ports in the province. As already stated, a portion of this squadron, with a flotilla of destroyers, left Augusta, in Sicily, on September 24, and on the following day was sighted cruising off Tripoli at a distance of 20 or 30 miles, the smaller ships closing in nearer at nightfall and using their searchlights.

On September 29, the day war was declared, the destroyer Garibaldino, under a flag of truce, went into the harbour to arrange with the Consul-General, Signor Galli, about the departure of the Italian subjects. On the afternoon of the same day a blockade of the coast was announced as extending from 11° 32′ E. to 27° 54′ E. of Greenwich. In the original announcement the eastern limit of the blockade was placed somewhat within Egyptian territory, but this mistake was afterwards rectified and the eastern limit placed at 25° 11′ E. The Powers were notified of the blockade on October 3. Blockade announced.

On October 1, Admiral Faravelli, in the Benedetto Brin, with the remaining ships of his squadron, arrived and sent in a summons to the Governor to surrender. The reply was a refusal, but time was asked for the foreign colony to withdraw from the place, and granted by the admiral. The exodus began, passenger steamers having been sent by the Italian Government to facilitate the departure of those wishing to leave the town. At the same time vessels visited

Benghazi, Homs and other ports to take off refugees. On that day the telegraph cable from Tripoli was cut by the destroyers Aiorone and Albatros, and the wireless station communicating with Constantinople was destroyed. The Turks meanwhile sank the Derna, transport, and a gunboat, the Sed-el-Bashr.

Defences of the city.

On the morning of October 3, the ships took up their positions preparatory to the bombardment of the forts. These latter were six in number, two in front of the city, to seaward, one known as the Lighthouse battery, and the other as the Mole or Red fort. One to the eastward of the city, near the village of Sharashet, known alternatively as Fort Hamidieh or Sidi Shahab, and three to the westward—the Gargarisch batteries, of which the nearest to the sea was called Fort Sultanieh. The Red Fort was built of brickwork, but the others were chiefly earthworks, and the heaviest guns mounted were of 9-in. calibre, and, with the possible exception of some of the lighter guns, were all of obsolete natures. The city itself, built on a lofty point close to the sea, is also surrounded by high walls, flanked with bastions. The country generally is flat, with, to the southward and eastward, many villages and palm groves, but to the westward a sandy desert.

Bombardment of the forts.

The positions taken up by the vessels for the bombardment were as follows:—the Francesco Ferruccio, Giuseppe Garibaldi and Varese, armoured cruisers, opposite Fort Hamidieh; the Benedetto Brin and Emanuele Filiberto, battleships, and Carlo Alberto, armoured cruiser, opposite the Red Fort and the Burj el Trado or Lighthouse Fort; while the Sardegna, Sicilia, and Re Umberto, battleships, were to settle the Gargarisch batteries. The first shot was fired from the Benedetto Brin, Vice-Admiral Faravelli's flagship, at 3.15 P.M., and the bombardment continued until sunset, by which time all the forts had been silenced and most of them were in ruins. The firing of the ships was carried out at a distance at which their guns far out-ranged the guns of the forts. On the morning of October 4, an Italian torpedo-boat entering the harbour was fired upon from Fort Hamidieh, whereupon the Giuseppe Garibaldi, the Francesco Ferruccio, and the Varese, the cruisers of Rear-Admiral Thaon de Revel's division, were ordered to complete the destruction of this work, and it was quickly silenced. This was practically the end of the Turkish resistance. Boats were then sent in to sweep for possible mines, and some of the men landing found the forts deserted.

In reporting the occurrences of these days, Admiral Aubry mentions that, on the night of September 27, one of the boats of the Roma, battleship, commanded by Lieutenant Olgeri, carried out a reconnaissance inside the harbour of Tripoli in the face of the

Turkish batteries. The coolness of this officer in his mission and the courage of the crew deserve, said the Admiral, to be made known to the whole of the Fleet. The Admiral also states that in the bombardment the Italians spared all the consulates, hospitals, churches, monasteries and convents, directing their fire only at the fortifications, which they were able to do with relative ease, as the range of the Turkish guns was so inferior to that of the Italians that the ships went in quite near. The protracted nature of the bombardment was due to a desire to respect the houses of the non-combatants and to avoid useless bloodshed. Judging by the havoc wrought by the Italian fire, all the forts might have been dismantled and the batteries silenced in a few hours, but at the cost of the lives of the defenders, a contingency which the Italians tried to avoid.

The Naval Brigade.

The Turkish transport Derna was found to have been sunk in shallow water and able to be refloated. Of this ship, it is stated that she only succeeded in running the blockade and reaching Tripoli because the Italian instructions were to let her pass, the landing of arms from her being regarded as a *casus belli* and an occasion for the opening of hostilities. Otherwise, said the officer who made this report, the Derna would have been captured 200 miles from Tripoli. "When we discovered her she was flying the German flag and had changed her name to Eitel Friedrich."

On October 5, the landing took place. A detachment of 500 seamen and marines were sent to occupy Fort Sultanieh and the other batteries at Gargarisch, and altogether 2000 men were landed from the fleet as a temporary garrison, while Rear-Admiral Borea Ricci was appointed interim Governor, and Commodore Cagni commander of the force ashore in the town.

The temporary Governor of Tripoli has had a distinguished career in the Navy. He took part in the blockade of Venezuela, and was present at the battle of Chemulpo at the beginning of the Russo-Japanese war. He was decorated by the Tsar for his efforts in saving the crews of the Russian men-of-war Variag and Korietz. A police service was established immediately after the landing of the seamen and marines. At noon on October 5 the Italian flag was hoisted on Fort Sultanieh and saluted by the whole Fleet.

The Red Sea Operations.

The business of the Red Sea division was to neutralise or destroy such menace as might be caused by the Turkish flotillas in the garrison towns on the sea coast of Arabia and the Sinai Peninsula. It was actually reported that the Turks intended to launch an expedition against the Italian colony of Erythrea. The division in

the Red Sea consisted of the Piemonte, Aretusa, Volturno, Stafetta, Puglia, Calabria, Liguria, some destroyers, torpedo-boats, and armed sailing vessels. The heavier vessels were only third-class cruisers, but of sufficient power to deal with any of the gunboats and other small craft which Turkey possessed in the waters of El Yemen. Early in October, it was reported that the Turkish fort at Hodeidah, having fired upon the Italian cruiser Aretusa, this vessel, with two others, sunk a couple of motor-boats used by the Turks for revenue purposes and armed with quick-firing guns, and also pursued the Turkish torpedo-gunboat Peik-i-Shevket, which escaped to the shelter of the fort. It would seem, therefore, that Turkey began hostilities in the Red Sea.

Bombardment of forts.

Towards the end of November, the fortified ports of Mocha and Sheikh-Said, at the southern end of the Red Sea, were bombarded, the reasons given for this step being that information had been received by the Italian Government of the concentration of Turkish troops at these places, as well as at Akaba and Hodeidah. The bombardment of these ports would have taken place earlier had it not been for the passage of the British Sovereign through the Red Sea, in deference to whom the operation was postponed. Sheikh Said, a natural port situated opposite the island of Perim, has been claimed by France. It was purchased in 1869 by the firm of Bazin, of Marseilles, but the Arab chief Ali Tabat, being dissatisfied with his bargain, appealed to the Turkish Government, and in the following year the Governor of Mocha reoccupied the place. During the War of 1870, France established a coaling station at Sheikh Said, but evacuated the place at the end of the war, and Turkey afterwards placed a garrison there. It is understood that France has never abandoned her rights to Sheikh Said, although these rights have never been admitted by the Ottoman Power. The fortifications of Akaba, at the foot of Mount Sinai, were also shelled at about the same time. An eye-witness of the fighting at Mocha relates that, in addition to bombarding the fortifications, the Italian cruiser sank several armed dhows in the port, and also others at Yoktul and Dubab.

In January, the Italian Minister of Marine received the following telegram from the commander of the Italian forces in the Red Sea, giving details of an action with Turkish gunboats fought near Kunfuda on January 7:—

Destruction of gunboats.

Having acquired the conviction that a number of Turkish gunboats had taken refuge in the internal canals of the Farsan islands, close to Kunfuda, and that a large detachment of troops occupied Loheia, Fort Midi, and Kunfuda, I decided to carry out a rapid combined operation with all the vessels at my disposal at Massowah, by co-ordinating the action of these vessels in such a manner that the gunboats would be unable to escape.

In order to hide my real intentions, I made a preliminary diversion with the Calabria and the Puglia, which bombarded the camp at Jebel Tahr. Immediately afterwards, I sent the Piemonte, the Garibaldino and the Artigliere, to explore the coast, starting from Jeddah, entering the interior canal of the Farsan Islands, and passing in front of Lith, to continue on towards the south. At the same time, I sent the Puglia and Calabria, as soon as they returned from Jebel Tahr, to bombard Loheia and Fort Midi, which were destroyed. The bombardment further caused damage to the camp and successfully harassed the columns of troops and camel convoys marching towards Loheia.

In the meantime, the Piemonte, the Garibaldino, and the Artigliere continued on the way through the northern canal on January 7, and pursued seven gunboats and the armed yacht Fauvette to Kunfuda.

Some of the gunboats made off upon seeing one of the scouting destroyers, and the others opened fire at a range of over 6000 mètres upon the Artigliere, which returned the fire, but awaited the arrival of the Piemonte and Garibaldino before approaching nearer.

When the two latter vessels came up, a sharp action began between our ships and the gunboats, which were supported by the land batteries. The fight lasted nearly three hours, and ended shortly before nightfall with the complete defeat of the enemy, whose ships were put out of action and retired, some of them being run ashore. The demoralised crews abandoned their vessels. There was no damage on our side. On the following morning, as it was impossible to save the badly battered gunboats, our ships completed the destruction with their guns, which set the vessels on fire. The yacht, however, was captured. Our ships subsequently bombarded the camp and a building over which the Turkish flag was flying. The enemy then abandoned Kunfuda. When they landed on the beach during the night the crews of the gunboats carried with them some ammunition, stores, and flags, which were seized in the morning by landing parties sent in armed boats from the Piemonte.

One of the boats which were destroyed had a displacement of 500 tons, another was of 350 tons, and five displaced 200 tons. The guns carried by these boats were 3-in., 9-pr., 3-pr., and 1-pr., quick-firing and machine guns of modern type. During no part of the action were mosques or private houses shelled.

I am awaiting the arrival of the Piemonte and the yacht, which were left at Kunfuda, where they are taking possession of the enemy's war material and carrying out some light repairs to the yacht, which will follow the Piemonte under the command of Captain Proli. This brilliant result was possible, thanks to the intelligent and courageous action of all commanders who co-operated bravely in the face of serious hydrographical difficulties.

The Garibaldino, mentioned above, and the Artigliere are torpedo-boat destroyers. The destruction of the Turkish gunboats in the Red Sea was not only a severe blow to Turkish prestige, but removed all danger of an attack on Erythrea.

Blockade of the Yemen.

In January, the Italian Government notified foreign Powers of the establishment of a blockade from the 22nd inst. by Italian ships of war on the Ottoman Red Sea Coast, between lat. 15° 11′ N. and lat. 14° 30′ N. A term fixed by the commander of the blockading squadron was granted to neutral vessels that they might be enabled to leave the blockaded area. Towards the end of January, the Piemonte captured near Hodeidah a motor barge similar to those sunk by the Italians at the outset of the war. These barges or launches were supplied to the Turkish Government for customs purposes and were built by Messrs. Thornycroft and Co. They had twin-screw petrol engines and mounted two guns.

From the outset of the war, the Italian ships took most energetic action in order to prevent any attempts at smuggling men or stores across the Red Sea into Africa for the purpose of reinforcing the

garrison in Cyrenaica. In October, the Russian steamer Vladimir, with Turkish troops on board, as well as the Turkish steamer Kizilermak, also carrying troops, arrived at Suez and were detained. In December, the Turkish hospital ship Kaiserieh was overhauled by the cruiser Puglia, when it was found that, although flying the Red Crescent flag, there was no trace on board of beds or other hospital arrangements, nor could any of her officers or crew point out surgical instruments or appliances. She was therefore seized on suspicion of being used as a Turkish transport on the Arabian coast. The British steamship Africa was overhauled by the Italian gunboat Volturno, in January. She was bound from Hodeidah to Aden, and the Italians removed twelve Turkish officers, including Colonel Riza Bey. Other British vessels, apparently unaware of the blockade, were overhauled by the Italian destroyer Granatiere early in February, but no captures were reported. Other vessels overhauled were the Austrian steamer Bregenz, the Russian steamer Odessa, and the French steamer Tavignano. There was a bombardment of Djebana in January, and in the following month Sheikh Said was again bombarded. In the latter month, several vessels were allowed to enter Hodeidah and remove their nationals.

Transport of the Expeditionary Force.

Trustworthy information about the transport of the expeditionary force has been very difficult to obtain, the accounts which have appeared being both meagre and, in some cases, contradictory. Altogether, the force to be carried appears to have been some 35,000 to 40,000 troops, in two divisions, which were conveyed to Africa in sixty chartered steam vessels. These vessels varied in tonnage from 1300 to 9200 tons, and were assembled at Naples, Genoa, and Palermo. In each transport was a naval officer as transport officer, with from ten to twenty naval seamen. The regular auxiliary cruisers, of which a list is given in Part II. of the *Naval Annual*, were armed with their guns.

Despatch of transports.

On October 5 and 6, five transports, carrying 1000 men, including a battalion of infantry and some artillery and engineers, left Italian ports and arrived at Marsa Tobruk on the 10th, for the purpose of relieving the naval detachment ashore there.

On October 9 the first transports left conveying the Army staff of the expedition and the first division of troops. This division was bound for Tripoli. According to Italian newspapers, the formation or organisation of the transport was in line ahead, with a cruiser leading and another on each beam. On getting out of Home waters, the organisation was altered. Two transports and a hospital ship,

escorted by a cruiser, were sent on ahead, and the other vessels were formed into two groups, one of nineteen and the other of fourteen vessels. Each group was convoyed by two battleships and several torpedo boats ahead and astern. At the same time a flotilla of destroyers was extended between Augusta and Tripoli to the eastward, covering the transports as they moved through the Mediterranean.

The transports sent in advance reached Tripoli, and five battalions of infantry were disembarked from these two vessels on October 11. On the following day, the group of nineteen transports arrived at Tripoli. This convoy had finished disembarking on October 15, by which time the second group had arrived, and these finished disembarking by the 18th. The landing of these 22,000 troops was effected without any incident, and the seamen then returned to their ships.

Troop boats for landing.

For the purposes of disembarking the troops, trestle piers were constructed by the engineers, and special troop boats, towed by steam launches, as well as lighters and large fishing craft, were used to put the men ashore. The following particulars of the boats used for disembarking troops from the transports are quoted from a technical journal:—

The transports carried four large flat-bottomed troop boats for landing purposes. These were carried two forward and two aft on either side in iron crutches on the gunwale. Each boat, built of iron, was 19 ft. 6 in. long, 9 ft. 9 in. wide, and 3 ft. deep. It was intended to carry thirty-eight or forty men, or as an alternative, about ten horses. The capacity could be enlarged by joining two or more of the troop boats together. For this purpose, locking bolts were fitted to secure the boats alongside one another, the space between being filled by a specially prepared platform. These troop boats could be put into the water and two of them locked up together in from four to five minutes. The naval seamen embarked in the transports had been specially instructed in the work of connecting the troop boats and handling them even in rough weather.

The second division left Italy in three or four groups, the first reaching Benghazi under an escort of several battleships, cruisers, and destroyers on October 18. A summons to surrender was rejected, but a delay of eighteen hours was allowed. The battleships Vittorio Emanuele III., Roma, and Napoli, with the cruisers Amalfi and Etruria, were to cover the landing. On the 19th, at 8 A.M., the ships opened fire, and a landing was effected, in spite of resistance on the part of the enemy. After the troops had occupied the outskirts of the town, they were fired upon from the houses, and the losses became so serious that the Admiral was reluctantly compelled to bombard the town. Benghazi was then evacuated by the enemy, and the Italians occupied it next morning.

According to the *Journal des Sciences Militaires*, accommodation in the troop transports was allowed at the rate of one cubic mètre (1·3 cubic yards) for each man, three cubic mètres (3·92 cubic yards) for each horse, and 10·5 cubic mètres (13·7 cubic yards) for each

vehicle. Similarly 1300 tons was allowed for each battalion of infantry with regimental transport, 900 tons for each squadron of cavalry, 1100 tons for each battery of artillery, and 1400 tons for each proportion of ammunition.

Transport statistics.

The report of an embarkation committee at Naples gives the following statistics of transports up to December 31. The first steam transport left Naples on the night of October 6 for Tobruk; subsequently in October there were thirteen different despatches of ships in fifty steamers; in November, twenty-one despatches in fifty-nine steamers; and in December, twenty-one despatches in forty-three steamers, in all, 152 sailings in not more than fifty-nine steamers. The total number of troops of all arms, non-combatants and others, embarked to December 31 was 101,389, including about 4000 officers. There were also 15,000 horses and mules, 200 war dogs, and about 400 guns. In the same period were shipped 12,000 oxen for slaughter, with a weight of 42,000 quintals; 40,000 qs. of wood for burning; 60,000 qs. of flour; 43,000 qs. of hay; over 70,000 tons of drinking water; 30,000 qs. of biscuits and preserved meats; 20,000 tons of barley; 16,000 hectolitres of wine; and hundreds of tins of mineral waters, spirits, coffee, sugar, etc. The quintal of the metric system is equal to 1·968 cwt., and a hectolitre is equal to 22 gallons. Technical material included photographic apparatus, acetylene torches, material for a Decauville field railway, fourteen aeroplanes, three balloons, with wood, cement, sand, barbed wire for entanglements, spades, etc.

Questions of Neutrality.

A *Gazette* Extraordinary was issued on October 3 containing a Proclamation of British neutrality, and citing the Act prohibiting the enlistment of British subjects in the military or naval service of either of the belligerent Powers, the building of ships and the furnishing of guns for a belligerent, and the equipment of expeditions against any Power. All persons offending against the Act are liable to fine and imprisonment, and "any person who aids, abets, counsels, or procures the commission of any offence against this Act shall be liable to be tried and punished as a principal offender."

British neutrality.

Despite the continued representations of the Italian Government to the contrary, it was some time before anxiety was allayed in connection with the reported landing of Italian troops in Europe and the extension of the area of disturbance. The Italian Embassy in London issued the following note:—

The various rumours of the landing of Italian troops in other parts of the Ottoman Empire than in Tripolitania and Cyrenaica are categorically denied.

Italy has not the remotest intention of landing troops in any part of the Ottoman Empire except in Tripolitania and Cyrenaica. A categorical denial in advance is given to any similar report that may come to hand later.

The operations which the Italian Navy is compelled to carry out in European waters are exclusively directed towards protecting Italian coasts, Italian open towns, the military expedition to Tripoli, and Italian merchant ships in the Adriatic and Ionian Seas from contemplated Turkish raids.

On October 25, the Italian Government officially notified the Powers of the cessation of Ottoman rule in North Africa, and on November 5 a decree was signed placing Tripoli and Cyrenaica under the entire sovereignty of Italy.

Contraband of war.

In its Notice of Contraband, the Italian Government, while defining all kinds of warlike stores and material as included, and liable to capture, declared coal and foodstuffs, "whatever their destination," exempt. It was not so clear that Turkey intended to take a similar course, and it was reported of the Ottoman Government that it proposed to treat corn consigned to Italian ports as contraband of war. On October 12, therefore, the Russian Government lodged a protest against such action, stating that if any attempt was made to arrest or confiscate cargoes of corn for Italian ports, so long as such cargoes were not destined for the Italian field forces, the Italian Navy, or for Italian official consignees, it would be regarded as a violation of the rights of Russia. The Ottoman reply was considered satisfactory, and the passage of merchant vessels through the Dardanelles has been practically unrestricted. At the same time, the Turks have taken precautions by strengthening the forts and placing mines, with the institution of regulations for the passage of merchant ships through the Straits. In February, in consequence of certain reported movements of Italian men-of-war, the Turkish Government notified the Powers that should an Italian fleet appear off the Dardanelles, the Straits would be closed with mines and the passage of neutral ships prohibited. Not only in the Dardanelles, but at Salonika and other Macedonian ports, as well as in some of the islands, have the Turks improved their defences since the declaration of war.

Blockading force.

By the end of October, the Navy had fulfilled the more important and strenuous portion of its work, and many of the ships were able to return to their home ports for refit. Thereafter, its duties consisted mainly in the suppression of the contraband trade which was carried on from European ports to the coast of Tripoli and Cyrenaica. To prevent the war supplies reaching the enemy, a blockade has been enforced by cruisers and destroyers and by armed merchant vessels. These last-named are vessels with a sea speed of from 18 to 19 knots, and carry six or eight 4·7-in quick-firers. They are manned by naval reservists. According to a statement in a technical journal

the mail steamers used for the purpose had not already gun positions provided in the original design, but before the war broke out were strengthened and fitted with gun platforms. At the same time, special magazines were fitted to carry 250 rounds per gun.

In addition to the blockade of the African coast, squadrons of cruisers and flotillas of destroyers patrolled the Eastern Mediterranean. To the blockaders was allotted the task of harrassing the caravans of war material which moved along the coast. With this object, on the Egyptian side, between Marsa Tobruk and the frontier, the port of Sidi Berrani was occupied by the Italians towards the end of November, and on the other side, Zuara, thirty miles from the Tunisian frontier, believed to be a depot for supplies, was bombarded. The Egyptian Government has taken energetic measures to prevent smuggling, but on the Tunisian side the population is so strongly in sympathy with the Arabs across the frontier that it has been found almost impossible entirely to stop the traffic in arms and ammunition, and this circumstance caused some irritation in Italy.

Stoppage of French steamers.

Several points of international law were raised in January by the action of Italian men-of-war in regard to French mail steamers. In January, the Carthage, the mail steamer between Marseilles and Tunis, was stopped by an Italian destroyer and escorted to Cagliari on the ground that in her cargo was an aeroplane intended for the use of the Turks. After some negotiation, the Italian Government ordered the release of the ship on the assurance of the French Government that the owner had given an undertaking not to employ his services or his aeroplane for the Turks. About the same time a Turkish Red Crescent mission left Marseilles in another mail steamer, the Manouba, for Tunis. This ship was also stopped and taken to Cagliari, where the Turkish passengers were landed and the ship enlarged. The French Government again protested against Italian action, and a little later the Italian Government expressed itself satisfied that all the Turks were *bonâ fide* members of a Red Crescent mission and ordered their release. Public opinion in France was much excited over this interference of the Italian authorities with their mail steamers, but the friendly and conciliatory attitude of the Governments on either side enabled an amicable adjustment of the matter to be arrived at. It was decided that all questions arising out of these incidents should be submitted to the Hague Arbitration Court.

Affair at Beyrout.

Another incident which arose out of the contraband traffic was the destruction of two Turkish ships in the Port of Beyrout on February 23. In that port were two Turkish vessels, the Avni Illah and the Angora. The former was an old armoured ship of

2314 tons displacement, built in 1869 and re-armed in 1906. She carried four 6-in. quick-firers and eighteen smaller guns. The Angora was a sister vessel to the Tokat, a torpedo-boat 165·8 feet long and displacing 165 tons, armed with two small machine guns, and launched in 1906. These two ships were believed to be affording help to the blockade runners, and on the morning in question the armoured cruisers Francesco Ferruccio and Giuseppe Garibaldi arrived off the port and demanded the surrender of the two warships. This summons was communicated to the Governor and to the consular authorities, and the Turks were given until nine o'clock to comply. At that time, no reply having been received, the Italians opened fire and were replied to vigorously by the enemy. At 9.20 the Avni Illah was silenced, a fire having broken out on board her. The Garibaldi then went into the port and destroyed the torpedo-boat. It is said that the Avni Illah was afterwards scuttled by her crew. Admiral Faravelli, in his report, denies the statement that the town was bombarded, and it appears that the damage said to have been caused by the fire from the ships was much exaggerated. Some of the people on shore were killed, and some buildings struck by the shells. A panic was caused in the town, but martial law was proclaimed by the Governor, and order quickly restored. In February, a blockade runner, carrying 250 tons of war material, machine guns, rifles, shrapnel, grenades, etc., was captured by the Italian patrol.

Miscellaneous.

Admiral Aubry's death.

To the regret of everybody, Admiral Aubry, who had commanded the fleet from the outbreak of war, died on board his ship from peritonitis on March 4. To his energy, capacity, and professional experience much of the success of the operations was due. He was born in 1849, and first saw service in the war with Austria in 1866. He also took part in the Abyssinian campaign as a lieutenant in 1889. He was twice Under-Secretary of State for the Navy, and for a time sat as deputy successively for Castellammare and Naples. He was succeeded in his command by Vice-Admiral Faravelli.

By a Royal Decree of November 26, a special flag was assigned to the naval landing parties. It was to be preserved generally on board the flagship, and to be handed to the commander of any naval force landed (*i.e.*, if a complete force), and with this flag, in reward of the gallantry already displayed by the naval forces, the gold medal of military valour was assigned—that is, to the flag and not to individuals. In proposing this award, Admiral Leonardi Cattolica, the Minister of Marine, cited certain facts to show the great services

of the seamen, "in preparing for and protecting the disembarkation of the Army," in which they had given many proofs of valour, which merited "both honour and reward."

Conduct of naval forces.

On the disembarkation of the Army, most of the seamen returned to their ships, but on October 23 two battalions of seamen were landed in support of the troops. Admiral Borea Ricci, in his report, said the *personnel* of the Navy were the admiration of all (fighting of October 26–27), and in a later report he said that on the 26th a party from the Sicilia, scarcely relaxing their fire, issued from the trenches to pursue the enemy. General Caneva stated that he was glad to confirm the sentiments of his admiration for the fine conduct of the officers and men of the landing party, who had so valiantly assisted in the happy result of the action. In connection with the affair at Benghazi, where the Navy lost one officer and six seamen killed, and two officers, one warrant officer, and eleven seamen wounded, General Briccola wrote that he was greatly contented with the seamen and the admirable troops; and the seamen were praised in an order of the day by the Naval Commander-in-Chief.

The Turkish ship Derna has been renamed Bengazi in memory of the fighting there. The Thetis, another captured vessel, was renamed Capitano Verri. Pietro Verri was an Army captain who in the attack on Sciara-Sciat, on October 26, when the Italians were attacked in front and rear, fought with "tenacity worthy of our ancient ancestors." Finding himself near a party of young seamen in the trenches, north of Henni, he joined them and led them against the enemy exclaiming "*Avanti Garabaldini del Mare!*" Amid a hail of bullets, sword in hand, and in the midst of the young seamen, he fell with the cry of "*Savoia!*"

As the war is still in progress, it would be premature to attempt to indicate all the lessons it may contain from a naval point of view. Hitherto, however, there is no evidence to show that in connection with such encounters as have taken place there will be much of value to obtain with regard to tactics or design. On the other hand, when the full accounts of the transport of the expedition are available, much useful information about equipment, stowage, etc., should be forthcoming. The silent, resolute, business-like manner in which the work of preparation and execution was carried out by the Italian Navy has aroused the admiration of all seamen. And, finally, as the First Lord of the Admiralty said on March 18, the events of the struggle have "reminded the world of those eternal troubles—that unreadiness for war did not secure peace, that insufficient strength invited aggression, and that the Power which commanded the sea was itself immune from attack."

CHAS. N. ROBINSON.

PART II.

LIST OF BRITISH AND FOREIGN SHIPS.
ORDNANCE TABLES.

PART II.

LIST OF BRITISH AND FOREIGN SHIPS.

The following abbreviations are used throughout the Alphabetical List:—

a.c. Armoured cruiser.
a.g.b. Armoured gunboat.
b. Battleship.
b.cr. Battle-cruiser.
c.d.s. Coast-defence ship.
comp. (in armour column). Compound or steel-faced armour.
cr. Cruiser.
d.v. Despatch vessel.
g.b. Gunboat.
g.v. Gun-vessel.
H.S. Harveyised or similar hard-faced steel.
K.S. Krupp steel.
shd. Sheathed.
P. Protected.
t. Turret-ship (in class column).
t. Speed and I.H.P. at trials (in speed and I.H.P. columns).
to.cr. Torpedo-cruiser.
to.g.b. Torpedo-gunboat.

l. Light guns under 15 cwt., including boats' guns.
M. Machine guns.
sub. Submerged torpedo tube.
A. Armstrong guns. K. Krupp guns.

The following abbreviations are used to distinguish the various types of boilers:—

W.T. Water-tube boilers, where the type is not known.
B. Belleville.
Bl. Blechynden.
B. & W. Babcock and Wilcox.
D'A. D'Allest.
D. Dürr.
E. Earle.
Ex. Express.
Du T. Du Temple.
L. Laird.
L.N. Laird-Normand.
M. Mumford.
My. Myabara.
Nic. Niclausse.
Nor. Normand.
N.S. Normand-Sigaudy.
R. Reed.
T. Thornycroft.
T.S. Thornycroft-Schulz.
W.F. White-Forster.
Y^1. Yarrow small tube.
Y^2. Yarrow large tube.
V.E. Vickers Express.
cyl. Cylindrical.

The following abbreviations distinguish types of turbines:—

P.T. Parsons. C.T. Curtis.

GREAT BRITAIN.—Armoured Ships.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Aboukir** shd.	12,000	440	69½	26¼	21,375 B.	Govan	Fairfield	1900	1902	751,118	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	5	2 *9·2-in.*, 12 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	21·6 *t*	800 1600	755
a.c.	**Achilles**	13,550	480	73½	27	23,275 Y² & cyl.	Elswick	Hawthorn	1905	1907	1,191,103*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 1 *12-pr.*, 29 *3-pr.*, 2 M.	3	23·27 *t*	1000	704
b.	**Africa**	16,350	425	78	26¾	18,698 B. & W. & cyl.	Chatham	J. Brown	1905	1906	1,461,429*	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 17 *3-pr.*, & M.	4	18·95 *t*	950 2150	781
b.	**Agamemnon**	16,500	410	79½	27	17,285 Y²	Dalmuir	Hawthorn Leslie	1906	1908	1,651,289*	12–6 K.C.	2	8	8	12	7	4 *12-in.*, 10 *9·2-in.*, 24 *12-pr.*, & 5 M.	5	18·75 *t*	900 2500	865
b.	**Ajax** ‡	23,000	555	89	27½	27,000 B. & W.	Greenock	Scott P.T.	1912	..	..	12	..	9	..	10	..	10 *13·5-in.*, 16 *4-in.*	3	21	..	..
b.	**Audacious** ‡					27,000 Y²	Birkenh'd	Cammell Laird P.T.	Bldg.	..	..											
b.	**Albemarle**	14,000	405	75½	26½	18,296 B.	Chatham	Thames Ironworks	1901	1903	1,009,835	7–3 K.S.	2–1	7	7 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·6 *t*	900 2000	750
b.	**Albion**	12,950	390	74	26	13,885 B.	Blackwall	Maudslay	1898	1902	858,745	6–2 H.N.	3–1	6	12–8 H.N.	12–6 H.N.	5 H.N.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	17·8 *t*	800 2300	700
a.c.	**Antrim**	10,850	450	68½	25	21,604 Y. & cyl.	Clydeb'nk	J. Brown	1903	1905	906,335*	6–2 H.N.	2–¾	..	4½ H.N.	6 H.N.	6 H.N.	4 *7·5-in.*, 6 *6-in.*, 1 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·02 *t*	800 1950	655
a.c.	**Argyll**					21,190 B. & W. & cyl.	Greenock	Greenock Foundry	1904	1906	906,308*									22·38 *t*		

a.c.	**Bacchante** shd.	12,000	440	69½	26¾	21,520 B.	Clydeb'nk	J. Brown	1901	1902	787,230	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	5	2 *9·2-in.*, 12 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	21·75 *t*	800 1600	755
b.	**Bellerophon** .	18,600	490	82	27	23,000 B. & W.	Portsm'th	Fairfield . P.T.	1907	1909	1,765,342*	11–6–4 K.C.	..	8	..	11 K.C.	..	10 *12-in.*, 16 *4-in.*, 5 M. .	3	21·80 *t*	900	870
b.	**Benbow** .	. Detail s not	pub lish ed				Dalmuir .	Beardmore P.T.	Bldg.	..	..	..	..	.	..	..	..	..	..	..	..	..
a.c.	**Berwick** .	. 9800	440	66	24½	22,681 Nic.	W. Beard-more & Co.	Humphrys	1902	1903	750,984	4–2 H.S.	2¾	..	5 N.S.	5–4 N.S.	4 N.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 9 M.G.	2	23·61 *t*	800 1600	537
a.c.	**Black Prince** .	13,550	480	73½	27	23,939 B. & W. & cyl.	Blackwall	Thames Ironworks	1904	1906	1,193,414*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 10 *6-in.*, 25 *3-pr.*, 2 M.	3	23·65 *t*	1000 2000	704
b.	**Britannia** .	. 16,350	425	78	26¾	18,725 B&W&cyl	Portsm'th	Humphrys	1904	1906	1,150,757*	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 17 *3-pr.*, M.	4	18·74 *t*	950 2150	781
b.	**Bulwark** .	. 15,000	400	75	26¾	15,000 B.	Devonp't	Hawthorn	1899	1902	997,846	9 H.S.	3–2	3 K.S.	12 H.S.	12–5 H.S.	6–2 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·15 *t*	900 2000	781
b.	**Cæsar** .	. 14,900	390	75	27½	12,000	Portsm'th	Maudslay .	1896	1897	885,212	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 6 *3-pr.*, 2 M., 2 l.	5	18·7 *t*	900 2000	757
b.	**Canopus**	. 12,950	390	74	26	13,500 B.	Portsm'th	Greenock Foundry	1897	1899	866,516	6 H.N.	3–1	6 H.N.	12 H.N.	12–5 H.N.	5 H.N.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·5 *t*	800 1850	700
a.c.	**Carnarvon**	. 10,850	450	68½	25	21,489 Nic.&cyl.	Beardm're	Humphrys	1903	1905	890,840*	6–2 K.S.	2–¾	..	4½ K.S.	6 N.S.	6	4 *7·5-in.*, 6 *6-in.*, 1 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·3 *t*	800	655
b.	**Centurion** ‡	. 23,000	555	89	27½	27,000 Y²	Devonp'rt	Hawthorn P.T.	1911	..	..	12	..	9	..	10	..	10 *13·5-in.*, 16 *4-in.* .	3	21	..	..
a.c.	**Cochrane** .	. 13,550	480	73½	27	23,654 Y² & cyl.	Govan .	Fairfield .	1905	1907	1,193,121*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 1 *12-pr.*, 29 *3-pr.*, 2 M.	3	23·29 *t*	1000	704
b.	**Collingwood**	. 19,250	500	84	27	24,500 Y²	Devonp't	Hawthorn P.T.	1908	1910	1,731,640*	10–6–4	¾–1¾	8	..	9	..	10 *12-in.*, 20 *4-in.*, 5 M. .	3	21·5 *t*	900	724
b.	**Colossus** .	. 20,000	510	85	27	25,000 B. & W.	Greenock	Scott . P.T.	1910	1911	1,672,663*	11–3	2½	8	..	10	..	10 *12-in.*, 16 *4-in.* . . .	3	21·5 *t*	900	..

* Total estimated cost of ship including guns.

‡ Particulars doubtful.

GREAT BRITAIN.—Armoured Ships—*continued*.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Commonwealth	16,350	425	78	26¾	18,538 B & W & cyl	Govan .	Fairfield .	1903	1905	1,481,811*	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 17 *3-pr.*, M.	4	19·01 *t*	950 2150	781
b.	Conqueror .	22,500	545	88½	27½	27,000 B. & W.	Dalmuir .	Beardmore P.T.	1911	1912	1,860,648*	12	..	9	..	10	..	10 *13·5-in.*, 16 *4-in.* . .	3	21	900 2700	..
a.c.	Cornwall . .	9800	440	66	24½	22,699 B. & W.	Pembroke	Hawthorn	1902	1904	756,274	4–2 H.S.	2–¾	..	5 N.S.	5–4 N.S.	4 N.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 9 M.	2	23·68 *t*	800 1600	537
b.	Cornwallis	14,000	405	75½	26½	18,238 B.	Blackwall	Thames S. Co.	1901	1904	1,030,302	7 K.S.	2–1	7	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·9 *t*	900 2000	750
a.c.	Cressy . shd.	12,000	440	69½	26¼	21,240 B.	Govan .	Fairfield .	1899	1901	749,324	6 K.S.	3–2	..	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	20·79 *t*	800 1600	755
a.c.	Cumberland .	9800	440	66	24½	22,000 B.	Glasgow	London & Glasgow Co.	1902	1904	718,168	4–2 K.S.	2–¾	..	5	5–4	4 N.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 9 M.	2	23·68 *t*	800 1000	537
a.c.	Defence . .	14,600	490	74½	26	27,570 Y²	Pembroke	Scotts S. & E. Co.	1907	1909	1,383,744*	6–4	1–½	3	..	8	7	4 *9·2-in.*, 10 *7·5-in.*, 16 *12-pr.*, 5 M.	5	23·5 *t*	1000	755
b.	Delhi‡ . .	25,000	580	..	..	..	Barrow .	Vickers . P.T.	Bldg.	..	..	..	..	..	..	..	..	10 *13·5-in.*	..	..	..	..
a.c.	Devonshire .	10,850	450	68½	25	21,475 Nic. & cyl.	Chatham	Thames Ironworks	1904	1905	850,877*	6–2	2–¾	..	4½ K.S.	6 N.S.	6	4 *7·5-in.*, 6 *6-in.*, 1 *12-pr.*, 22 *3-pr.*, 2 M.	2	22·97 *t*	800 1600	655
b.	Dominion .	16,350	425	78	26¾	18,438 B. & W. & cyl.	Barrow .	Vickers .	1903	1905	1,455,190*	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 K.S.	7	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 17 *3-pr.*, M.	4	19·5 *t*	950 2150	781
a.c.	Donegal . .	9800	440	66	24½	22,173 B.	Govan .	Fairfield Co.	1902	1903	715,947	4–2 K.S.	2–¾	..	5 K.S.	5–4	4 K.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 9 M.	2	23·56 *t*	800 1600	537
a.c.	Drake . .	14,100	500	71	26	31,450 B.	Pembroke	Humphrys	1901	1902	1,002,977	6 K.S.	3–2	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 2 M.	2	24·11 *t*	1250 2500	900
b.	Dreadnought	17,900	490	82	26½	27,500 B. & W.	Portsm'th	Vickers . P. T.	1906	1906	1,813,100*	11–6–4 K.C.	2¾–1¾	8	..	11	..	10 12-in., 24 *12-pr.* Q.F., 5 M.	5	21·85 *t*	900 2700	800

a.c.	**Duke of Edinburgh**	13,550	480	73½	27	23,685 B. & W. & cyl.	Pembroke	Hawthorn Leslie	1904	1906	1,201,687*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 10 *6-in.*, 25 *3-pr.*, 2 M.	3	22·84 *t*	1000	704
b.	**Duncan** .	14,000	405	75½	26½	18,222 B.	Blackwall	Thames S. Co.	1901	1903	1,023,147	7 K.S.	2–1	7	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·9 *t*	900/2000	750
a.c.	**Essex** .	9,800	440	66	24½	22,000 B.	Pembroke	J. Brown	1901	1903	739,946	4–2 K.S.	2–¾	..	5	5	4 K.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	22·79 *t*	800/1600	537
a.c.	**Euryalus** . shd.	12,000	440	69½	26¼	21,318 B.	Barrow	Vickers	1901	1904	782,901	6 K.S.	3–2	2	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 8 M.	2	21·63 *t*	800/1600	755
b.	**Exmouth** .	14,000	405	75½	26½	18,346 B.	Birkenh'd	Laird	1901	1903	1,032,409	7 K.S	2–1	7	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	19·0	900/2000	750
b.	**Formidable** .	15,000	400	75	26¾	15,000 B.	Portsm'th	Earle	1898	1901	1,022,745	9 H.S.	3–2	2	12 H.S.	12–5	8 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·13 *t*	900/2000	781
b.	**Glory** .	12,950	390	74	26	13,500 B.	Birkenh'd	Laird	1899	1901	841,014	6 H.N.	3–2	6 H.N.	12 H.N.	12–5 H.N.	5 H.N.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·12 *t*	800/1850	700
b.	**Goliath** .	12,950	390	74	26	13,500 B.	Chatham	Penn	1898	1900	866,006									18·4 *t*		
a.c.	**Good Hope** .	14,100	500	71	26	31,071 B.	Govan	Fairfield	1901	1902	990,759	6 K.S.	3–2	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 2 M.	2	23·5 *t*	1250/2500	900
a.c.	**Hampshire** .	10,850	450	68½	25	21,508 Y. & cyl.	Elswick	Hawthorn	1903	1905	866,527*	6–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	..	4 *7·5-in.*, 6 *6-in.*, 1 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·47 *t*	800/1600	655
b.	**Hannibal** .	14,900	390	75	27½	12,000	Pembroke	Harland	1896	1897	906,799	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 6 *3-pr.*, 2 M., 2 l.	5	18·0 *t*	900/2200	757
b.	**Hercules** .	20,000	510	85	27	25,700 Y²	Jarrow	Palmer P.T.	1910	1911	1,660,950*	11–3	2½	8	..	10	..	10 *12-in.*, 16 *4-in.*	3	21·5 *t*	900	..
b.	**Hibernia** .	16,350	425	78	26¾	18,000 B. & W. & cyl.	Devonp'rt	Harland & Wolff	1905	1906	1,444,828*	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 17 *3-pr.*, & M.	4	19·0	950/2150	781
b.	**Hindustan**					18,521 B. & W. & cyl.	Clydeb'nk	J. Brown	1903	1905	1,454,526*	9 K.S.	2–1	8–7	12 K.S.	12–6 N.S.	7 N.S.			19·01 *t*		
a.c.	**Hogue** . shd.	12,000	440	69½	26¼	21,432 B.	Barrow	Vickers	1900	1902	749,809	6 K.S.	3	2 H.S.	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	22·6 *t*	800/1600	755

* Total estimated cost of ship including guns.

‡ Particulars doubtful.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in	in.	in.			knots.	tons.	
b.	Illustrious	14,900	390	75	27½	12,000	Chatham	Penn	1896	1898	894,585	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 6 *3-pr.*, 2 M., 2 l.	5	16·5 *t*	900 2200	757
b.	Implacable	15,000	400	75	26¾	15,000 B.	D'port	Laird	1899	1902	989,116	9 K.S.	3–2	2	12 K.S.	12–5 K.S.	6	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·2 *t*	900 2000	781
b.	Irresistible						Chatham	Maudslay	1898	1901	1,048,136											
b.c.	Invincible	17,250	530	78½	26	41,000 Y^2	Elswick	Humphrys P.T.	1907	1909	1,768,995*	6–4 K.C.	..	3	..	7	..	8 *12-in.*, 16 *4-in.*, 5 M.	5	26	1000	731
b.c.	Inflexible					41,000 Y^2	Clydeb'k	J. Brown P.T.	1907	1908	1,728,229*											
b.c.	Indomitable					41,000 B. & W.	Govan	Fairfield P.T.	1907	1908	1,761,080*											
b.c.	Indefatigable	18,750	555	80	26½	43,000 B. & W.	Devonp'rt	J. Brown P.T.	1909	1911	1,536,769*	6–4	..	..	..	7	..	8 *12-in.*, 16 *4-in.*	2	25	1000	..
b.	Iron Duke¶	25,000	580	..	..	..	Portsm'th	Cammell Laird P.T.	Bldg.	..	..	..	..	..	..	..	..	10 *13·5-in.*	..	..	..	..
b.	Jupiter	14,900	390	75	27½	12,000	Clydeb'nk	Thomson	1895	1897	902,011	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 6 *3-pr.*, 2 M., 2 l.	5	18·4 *t*	900 2200	757
a.c.	Kent	9800	440	66	24½	21,000 B.	Portsm'th	Hawthorn	1901	1903	700,283	4–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	21·7 *t*	800 1600	537
b.	King Edward VII.	16,350	425	78	26¾	18,138 B. & W. & cyl.	Devonp'rt	Harland	1903	1905	1,473,245*	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 N.S.	7	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 17 *3-pr.*, M.	4	19·04 *t*	950 1200	781
b.	King George V.¶	23,000	555	89	27½	27,000 B. & W.	Portsm'th	Parsons P.T.	1911	..	..	12	..	9	..	10	..	10 *13·5-in.*, 16 *4-in.*	3	21	..	..
a.c.	King Alfred	14,100	500	71	26	30,893	Barrow	Vickers	1901	1903	978,125	6-5-4 K.S.	2½–1	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 2 l.	2	23·46 *t*	1250	813
	Leviathan					31,203 B.	Clydeb'nk	J. Brown			1,012,959									23·28 *t*	2500	

a.c.	**Lancaster** .	9800	440	66	24½	22,000 B.	Elswick .	Hawthorn	1902	1904	732,858	4–2 K.S.	2–¾		5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 9 M.	2	24·01 *t*	800 1600	537
b.c.	**Lion** . .	26,350	660	88½	28	70,000 Y²	Devonport	Vickers P.T.	1910	..	2,068,337*	9	..	6	..	9	..	8 *13·5-in.*, 16 *4-in.* . .	2	28	1000	..
b.	**London** .	15,000	400	75	26½	15,000 B.	Portsm'th	Earle	1899	1902	1,036,393	9 K.S.	3–2	2	12 K.S.	12–5 K.S.	6	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·1 *t*	900 2000	781
b.	**Lord Nelson** .	16,500	410	79½	27	16,750 B. & W	Jarrow .	Palmer	1906	1908	1,654,038*	12–6 K.C.		8	8	12	..	4 *12-in.*,10 *9·2-in.*,24 *12-pr.*, 5 M.	5	18·9 *t*	900 2200	747
b.	**Magnificent** .	14,900	390	75	27½	12,000	Chatham	Penn	1894	1895	908,789									17·6 *t*		
b.	**Majestic** .	14,900	390	75	27½	12,000	Portsm'th	Barrow	1895	1895	916,382	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 6 *3-pr.*, 2 M., 2 l.	5	17·9 *t*	900 2200	757
b.	**Mars** .	14,900	390	75	27½	12,000	Birkenh'd	Laird	1896	1897	902.402									17·7 *t*		
b.	**Marlborough** ¶	25,000	580	..	..	..	Devonport	Hawthorn P.T.	Bldg.	..	..	..	..	..	..	..	..	10 *13·5-in.*	..	..	..	..
a.c.	**Minotaur** .	14,600	490	74½	26	27,856 Y²	Devonp'rt	Harland & Wolff	1906	1908	1,438 065*	6–4	1–½	6	..	8	7	4 *9·2-in.*, 10 *7·5-in.*, 16 *12-pr.*, 5 M.	5	23·01 *t*	1000	755
b.	**Monarch** .	22,500	545	88½	27½	28,555 Y²	Elswick .	Hawthorn. P. T.	1911	1912	1,886,912*	12	..	9	..	10	..	10 *13·5-in.*, 16 *4-in.* . .	3	21·88	900 2700	..
a.c.	**Monmouth** .	9800	440	66	24½	22,000 B.	Glasgow	London & Glasgow	1901	1903	979,591	4–2 K.S.	2–¾	4 K.S.	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	22·58 *t*	800 1600	537
a.c.	**Natal** .	13,550	480	73½	27	23,592 Y² & Cyl.	Barrow .	Shipbg.Co. Vickers .	1905	1907	1,218,244*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 1 *12-pr.*, 29 *3-pr.*, 2 M.	3	23·33 *t*	1000	704
b.	**Neptune** .	19,900	510	85	27	27,721 Y²	Portsm'th	Harland & Wolff † P.T.	1909	1911	1,715.258*	10–3	2½	8	..	9	..	10 *12-in.*, 16 *4-in.* . .	3	21·78 *t*	900	..
b.c.	**New Zealand** ¶	18,800	555	80	26½	41,000 B. & W.	Govan .	Fairfield P.T.	1911	..	..	..	..	..	..	..	..	8 *12-in.*, 16 *4-in.* . .	2	25	1000	..
b.	**Ocean** .	12,950	390	74	25½	13,500 B.	Devonport	Hawthorn	1898	1900	883,778	6 H.N.	2–1	6	12 H.N.	12–5 H.N.	5 H.N.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4 (4 sub.)	18·74 *t*	800 1850	700
b.	**Orion** .	22,500	545	88½	27½	27,000 B. & W.	Portsm'th	Wallsend P. T.	1910	1911	1,918,773*	12	..	9	..	10	..	10 *13·5-in.*, 16 *4-in.* . .	3	21	900 2700	..

* Estimated cost of ship including guns. † By arrangement with John Brown & Co. ¶ Particulars uncertain.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Prince George** .	14,900	390	75	27½	12,000	Portsm'th	Humphrys	1895	1896	895,504	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 6 *3-pr.*, 2 l.	5	18·3 *t*	900 2200	757
b.	**Prince of Wales**	15,000	400	75	26¾	15,000 B.	Chatham	Greenock Foundry	1902	1904	1,114,079	9 K.S.	2–1	3	12 K.S.	12–6 N.S.	6–2 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·0	900	781
b.c.	**Princess Royal** .	26,350	660	88½	28	70,000 Y²	Barrow .	Vickers . P.T.	1911	..	2,013,886*	9	..	6	..	9	..	8 *13·5-in.*, 16 *4-in.* . .	2	28	1000	..
b.c.	**Queen Mary** ¶ .	27,000	660	89	28	75,000	Jarrow .	J. Brown . P.T.	1912	..	..	9	..	6	..	9	..	8 *13·5-in.*. 16 *4-in.* . .	2	28	1000	..
b.	**Queen** . .	15,000	400	75	26¾	15,000 B & W.	Devonport	Harland & Wolff	1902	1904	1,074,999	9 K.S.	2–1	3	12 K.S.	12–6 N.S.	6–2 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·39 *t*	900	781
b.	**Renown** . shd.	12,350	380	72	26¾	12,000	Pembroke	Maudslay	1895	1896	709,706	8–6 H.S.	3–2	..	10–6 H.S.	10 H.S.	6–2	4 *10-in.*, 10 *6-in.*, 12 *12-pr.*, 10 *3-pr.*, 2 M., 2 l.	5 (2 sub.)	18·75 *t*	900 1450	674
a.c.	**Roxburgh**. .	10,850	450	68½	25	22,102 D. & cyl.	Glasgow	London & Glasgow Company	1904	1905	862,077*	6–2 K.S.	2–¾	..	4½ K.S.	6 N.S.	6	4 *7·5-in.*, 6 *6-in.*, 1 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·63 *t*	800 1600	655
b.	**Russell** . .	14,000	405	75½	26½	18,229 B.	Jarrow .	Palmer .	1901	1903	1,037,995	7 K.S.	2-1	7 K.S.	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	19·3 *t*	900 2000	750
b.	**St. Vincent** .	19,250	500	84	27	24,500 B. & W.	Portsm'th	Scott's S. . P.T.	1908	1910	1,754,615*	10	¾–1¾	8	..	9	..	10 *12-in.*. 20 *4-in.*, 5 M. .	3	21·9 *t*	900	724
a.c.	**Shannon** . .	14,600	490	75½	25	28,553 Y²	Chatham	Humphrys	1906	1908	1,423,410*	6–4	1–½	3	..	8	..	4 *9·2-in.*, 10 *7·5-in.*, 16 *12-pr.*, 5 M.	5	22·49 *t*	950	755
a.c	**Suffolk** . .	9800	440	66	24½	22,000 Nic.	Portsm'th	Humphrys	1903	1904	722,681	4–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 8 *12-pr.*, 5 *3-pr.*, 9 M.	2	24·7 *t*	800 1600	537
a.c.	**Sutlej** . shd.	12,000	440	69½	26¼	21,261 B.	Clydeb'nk	J. Brown .	1899	1902	755,690	6 K.S.	3–2	..	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 12 *12-pr.*, 5 *3-pr.*, 8 M., 2 l.	2	21·77 *t*	800 1600	755

b.	**Superb** .	18,600	490	82	27	23,000 B. & W.	Elswick .	Wallsend . P. T.	1907	1909	1,660,446*	11-6-4 K.C.	..	8	..	11 K.C.	..	10 *12-in.*, 16 *4-in.* B.L., 5 M.	3	21·6 *t*	900	870
b.	**Temeraire**.					23,000 Y[2]	Devonport	Hawthorn. P. T.	1907	1909	1,743,955*									22·07 *t*		
b.c.	**Tiger** .	. Details not published					Clydeb'nk	J. Brown . P. T.	Bldg.	..	..	..	..	..	..	..	..	..	..	..	..	..
b.	**Swiftsure** .	11,800	436	71	$24\frac{1}{2}$	12,500	Elswick .	Humphrys, Tennant	1903	1904	845,036	7	3	7	..	10	7 K.S.	4 *10-in.*, 14 *7·5-in.*, 14 *14-pr.*, 2 *12-pr.*, 8 *6-pr.*, & M.	2	19·6 *t*	800 / 2000	700
b.	**Triumph** .						Barrow .	Vickers .	1903	1904	845,479											
b.	**Thunderer**	. 22,500	545	$88\frac{1}{2}$	$27\frac{1}{2}$	27,426 B. & W.	Blackwall	Thames Ironworks P. T.	1911	..	1,885,145*	12	..	9	..	10	..	10 *13·5-in.*, 16 *4-in.* .	3	21	900 / 2700	..
b.	**Vanguard**	. 19,250	500	84	27	24,500 B. & W.	Barrow .	Vickers . P. T.	1909	1910	1,607,781*	10	$\frac{3}{4}$–$1\frac{3}{4}$	8	..	9	..	10 *12-in.*, 20 *4-in.*, 5 M. .	3	22·1 *t*	900	724
b.	**Venerable**.	. 15,000	400	75	$26\frac{3}{4}$	15,345 B.	Chatham	Maudslay	1899	1902	1,092,753	7 K.S.	4–$2\frac{1}{2}$	3	14 K.S.	11–6 K.S.	6–2	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·3 *t*	900 / 2000	781
b.	**Vengeance**	. 12,950	390	74	26	13,500 B.	Barrow .	Vickers .	1899	1901	836,417	6 K.S.	2–1	6	12 K.S.	12–6 K.S.	5 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·5 *t*	800 / 1850	750
b.	**Victorious**	. 14,900	390	75	$27\frac{1}{2}$	12,000	Chatham	Hawthorn	1895	1897	885,212	9 H.S.	3–$2\frac{1}{2}$	9	14–9 H.S.	14–6 H.S.	6	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 6 *3-pr.*, 8 M., 2 l.	5 (4 sub.)	18·7 *t*	900 / 2200	757
a.c.	**Warrior** .	. 13,550	480	$73\frac{1}{2}$	27	23,641 Y[2] & cyl.	Pembroke	Wallsend .	1905	1907	1,186,395*	6–4–3 K.S.	$\frac{3}{4}$–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 1 *12-pr.*, 29 *3-pr.*, 2 M.	3	22·9 *t*	1000	704
b.	**Zealandia** . (*ex* New Zealand.)	. 16,350	425	78	$26\frac{3}{4}$	18,440 Nic. & Cyl.	Portsm'th	Humphrys	1904	1905	1,424,375*	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 K.S.	7	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 17 *3-pr.*, M.	4	18·59 *t*	950 / 2150	781
	4 Armoured ships‡.	Details not published.					1 Portsmouth, 1 Devonport, 2 by contract.	Pro.														

* Total estimated cost of ship, including guns. ‡ Programme 1912–13. ¶ Particulars uncertain.

The battleships **Empress of India** (1891) and **Revenge** (1892) are still retained in the Navy List. The **Nile**, **Ramillies**, **Resolution**, **Royal Oak**, and **Royal Sovereign** are on the subsidiary list.

GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
P. 3rd cl. Cr.	Active . .	3440	385	$41\frac{1}{2}$	$13\frac{3}{4}$	18,000 Y.	Pembroke	Hawthorn. P.T.	1911	1911	272,977*	..	..	10 *4-in.* B.L., and M. .	2	26·0 *t*	350	..
,, ,,	Amphion . .	3440	385	$41\frac{1}{2}$	$13\frac{3}{4}$	18,000 Y.	Pembroke	Parsons . P.T.	1911	..	275,307*	..	..	10 *4-in.* B.L., and M. .	2	25·0	350	..
Scout. .	Adventure .	2670	374	$38\frac{1}{4}$	$13\frac{1}{2}$	15,850 Y mod.	Elswick .	Hawthorn.	1904	1905	270,263	2	$\frac{3}{4}$	10 *12-pr.*, 8 *3-pr.* .	2	25·42 *t*	150	268
P. 3rd cl. Cr.	Æolus . shd.	3600	300	43	$17\frac{1}{2}$	9000	Devonp'rt	Hawthorn.	1891	1893	213,180	2–1	2	2 *6-in.*, 6 *4·7-in.*, 13 *6-pr.*, *3-pr.*, M.	3	19·75	400 / 535	273
,, ,,	Amethyst . .	3000	360	40	$14\frac{1}{2}$	14,200 Y mod.	Elswick .	Parsons . P.T.	1903	1905	228,426	..	..	12 *4-in.*, 11 *3-pr.*, M. .	2	23·42 *t*	300	296
P. 1st cl. Cr.	Amphitrite shd.	11,000	435	69	$25\frac{1}{4}$	18,000 B.	Barrow .	Vickers .	1898	1900	552,795	4	3–6 H. S.	16 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 2 M.	2 (1 sub.)	20·75	1000	677
,, ,,	Andromeda shd.	11,000	435	69	$25\frac{1}{4}$	16,500 B.	Pembroke	Hawthorn.	1897	1900	574,916	3–6	3–6 H.S.	16 *6-in.*, 12 *12-pr.*, 4 *3-pr.*, 2 M.	2	20·5	1000	600
,, ,,	Argonaut . shd.	11,000	435	69	$25\frac{1}{4}$	18,000 B.	Govan .	Fairfield .	1898	1900	545,756	4	3–6 H. S.	16 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 2 M.	2 (1 sub.)	20·75	1000	677
,, ,,	Ariadne . shd.	11,000	435	69	$25\frac{1}{4}$	18,000 B.	Clydeb'nk	J. Brown .	1898	1900	541,927							
P. 3rd cl. Cr.	Astræa . shd.	4360	320	$49\frac{1}{2}$	19	9112	Devonp'rt	Devonport	1893	1894	254,217	2–1	3	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·75	400	312
Scout . .	Attentive . .	2670	374	$38\frac{1}{4}$	$13\frac{1}{2}$	16,212 Y.	Elswick .	Hawthorn .	1904	1906	270,263	2	$\frac{3}{4}$	10 *12-pr.*, 8 *3-pr.* .	2	25·88 *t*	150	268
P. 3rd cl. Cr.	Barham . .	1830	280	35	$13\frac{1}{4}$	4700 T.	Portsm'th	Hawthorn .	1889	1890	113,702	2–1	2	6 *4·7-in.*, 6 *3-pr.*, M.	2	18·6	140	169
,, ,,	Bellona . .	3360	385	$41\frac{1}{2}$	$13\frac{3}{4}$	18,000 Y.	Pembroke	Fairfield . P.T.	1909	1910	283,038*	$\frac{1}{2}$–1	..	6 *4-in.* B L., and M. .	2	25·9 *t*	450	263

P. 2nd cl.	Birmingham†		..	..	..	..	..	Elswick	Hawthorn	..	..	..	..	..	..	..	..	..	..
P. 3rd.cl.Cr.	Blanche		3350	385	41½	13½	18,512 Y.	Pembroke	Hawthorn. P.T.	1909	1910	288,482*	..	..	10 *4-in.* B.L. and M.	2	25·67 *t*	350	292
,, ,,	Blonde		3350	385	41½	13½	18,770 Y.	Pembroke	Cammell Laird P.T.	1910	1911	267,754*	..	..	10 *4-in.* B.L. and M.	2	25·43 *t*	350	292
,, ,,	Boadicea		3300	385	41	13½	18,000 Y.	Pembroke	J. Brown. P.T.	1908	1909	330,631*	½–1	..	6 *4-in.*, B.L. and M.	2	25·75 *t*	450	263
,, ,,	Brilliant	shd.	3600	300	43¾	17½	9164	Sheerness	Hawthorn.	1891	1893	218,145	2–1	2	2 *6-in.*, 6 *4·7-in.*, 1 3 *6-pr.*, *3-pr.*, M.	3	19·7	400	273
P. 2nd cl. Cr.	Bristol		4800	430	47	15¼	24,529 Y.	Clydeb'nk	J. Brown. C.T.	1910	1910	364,953*	2–1	..	2 *6-in.*, 10 *4-in.* B.L., 1 *12-pr.*, 4 M.	2	26·84	650	376
P. 3rd cl. Cr.	Cambrian.	shd.	4360	320	49½	19	9000	Pembroke	Hawthorn.	1893	1894	244,725	2–1	2	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·5	400	312
P. 2nd cl. Cr.	Challenger		5880	355	56	21¼	12.500 B.&W	Chatham	Wallsend Eng'ng Co.	1902	1904	360,194	3–2	..	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 2 M.	2	21·0	500	454
P. 3rd cl. Cr.	Charybdis	shd.	4360	320	49½	19	9000	Sheerness	Earle	1893	1895	241,029	2–1	2	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·5	400	312
P. 2nd cl. Cr.	Chatham		5400	430	49¾	15¾	22,000 Y.	Chatham.	Thames Ironworks P.T.	1911	..	335,024*	..	..	8 *6-in.*, 4 *3-pr.*, 4 M., 1 l.	2	24·75	650	..
P. ,, ,,	Crescent	shd.	7700	360	60	23¾	12,000	Portsm'th	Penn	1892	1894	392,453	5–1	6	1 *9·2-in.*, 12 *6-in.*, 1 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2 (1 sub.)	19·7	850	560
P. ,, ,,	Dartmouth		5250	430	48½	15½	22,000 Y.	Barrow	Vickers P.T.	1911	1911	329,406*	..	..	8 *6-in.*, 4 *3-pr.*, 4 M.	2	25·9 *t*	650	390
P. 1st cl. Cr.	Diadem	shd.	11,000	435	69	26	16,500 B.	Govan	Fairfield	1896	1899	554,863	4–2½	4½–2	16 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 2 M.	2 (1 sub.)	20·5	1000	357
P. 3rd cl. Cr.	Diamond		3000	360	40	14½	10,066 N. L.	Birkenh'd	Laird	1904	1905	231,010	..	..	12 *4-in.*, 11 *3-pr.*, M.	2	22·17 *t*	300	296
P. 2nd cl. Cr.	Diana	shd.	5600	350	54	21	9600	Govan	Fairfield	1895	1898	253,009	2½	3	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 5 M., 1 l.	3	19·5	550	449
,, ,,	Dido	shd.	5600	350	54	21	9600	Glasgow.	London and Glasgow Co.	1896	1898	254,190							
,, ,,	Doris	shd.	5600	350	54	21	9600	Barrow	Vickers	1896	1898	256,306				3 (2 sub.)	19·5	550	449

* Total estimated cost of ship including guns.

† Details not published.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
P. 2nd cl. Cr.	Dublin	5400	430	49$\frac{3}{4}$	15$\frac{3}{4}$	25,000 Y.	Dalmuir	Beardmore P. T.	Bldg.	..	334,058*	..	..	8 *6-in.*, 4 *3-pr.*, 4 M., 1 l.		25·5	650	..
,, ,,	Eclipse shd.	5600	350	53	20$\frac{1}{4}$	9600	Portsm'th	Portsm'th	1894	1897	276,313	1$\frac{1}{2}$–3	3	5 *6-in.*, 6 *4·7in.*, 9 *12-pr.*, 1 *3-pr.*, 5 M., 1 l.	3	19·5	550	456
,, ,,	Edgar	7350	360	60	23$\frac{3}{4}$	12,000	Devonp'rt	Fairfield	1890	1893	410,980	5–1	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	4	20·5	850	544
,, ,,	Encounter	5880	355	56	20$\frac{1}{4}$	12,500 Dürr	Devonp'rt	Devonport Dockyard	1903	1906	370,275	3–2	..	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 2 M.	2	20·75 to 21·0	600	454
,, ,,	Endymion	7350	360	60	23$\frac{3}{4}$	12,000	Hull	Earle	1891	1894	375,350	5–1	6	2 *9·2-in.*, 10 *6-in.*, 1 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	20·5	850	544
P. 1st cl. Cr.	Europa shd.	11,000	435	69	26	16,500 B.	Clydeb'nk	Thomson	1897	1899	564,690	4–2$\frac{1}{2}$	4$\frac{1}{2}$–2	16 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 2 M.	2	20·5	1000	357
P. 2nd cl. Cr.	Falmouth	5250	430	48$\frac{1}{2}$	15$\frac{1}{2}$	23,467 Y.	Dalmuir	Beardmore P. T.	1910	1911	337,473*	..	..	8 *6-in.*, 4 *3-pr.*, 4 M.	2	25·5	650	390
P. 3rd cl. Cr.	Fearless	3360	..	..	..	18,000	Pembroke	Beardmore P.T.	Bldg.	..	..	..	..	....	..	25·0	..	..
,, ,,	Flora shd.	4360	320	49$\frac{1}{2}$	19	9000	Pembroke	Vickers	1893	1895	242,276	2–1	2	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·5	400	312
,, ,,	Forte. shd.	4360	320	49$\frac{1}{2}$	19	9000	Chatham	Chatham	1893	1895	240,571							
,, ,,	Fox shd.	4360	320	49$\frac{1}{2}$	19	9000	Portsm'th	Portsm'th	1893	1895	245,571							
Scout	Foresight	2850	360	39	14	14,277 T.	Govan	Fairfield	1904	1905	285,672	1$\frac{1}{2}$–$\frac{5}{8}$	..	14 *12-pr.*	2	25·12 *t*	150	268
,,	Forward					15,018 T.					285,326					25·15 *t*	380	

P. 2nd cl. Cr.	Gibraltar . shd.	7700	360	60	23¾	12,000	Glasgow .	Napier .	1892	1894	373,236	5–1	6	2 *9·2-in.*, 10 *6-in.*, 1 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	19·7	850	544
,, ,,	Glasgow .	4800	430	47	15¼	22,472 *t*	Govan .	Fairfield P. T.	1909	1910	354,884*	2–1	..	2 *6-in.*, 10 *4-in.*, 1 *12-pr.*, 4 M.	2	25·8 *t*	650	376
,, ,,	Gloucester .					23,757 *t*	Dalmuir	Beardmore P. T.			353,856*					26·29 *t*		
,, ,,	Grafton .	7350	360	60	23¾	12,000	Blackwall	Humphrys	1892	1894	372,890	..	6	2 *9·2-in.*, 10 *6-in.*, 1 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	20·0	850	560
,, ,,	Hawke .	7350	360	60	23¾	12,000	Chatham.	Fairfield .	1891	1893	400,702	5–1	6	2 *9·2-in.*, 10 *6-in.*, 1 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	20·0	850	544
,, ,,	Hermes . shd.	5600	350	54	20½	10,000 B.&W.	Govan .	Fairfield .	1898	1900 1902	281,776	1½–3	3	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 2 M.	2	20·0	600	456
,, ,,	Highflyer shd.	5600	350	54	20½	10,000 B.	Govan .	Fairfield .	1898	1900	280,182							
,, ,,	Hyacinth . shd.	5600	350	54	20½	10,000 B.	Glasgow .	London and Glasgow Co.	1898	1901	288,595							
P. 3rd cl. Cr.	Hermione shd.	4360	320	49½	19	9000	Devonp'rt	Thomson .	1893	1895	223,324	2–1	2	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·5	400	312
T. G. B. .	Hussar .	1070	250	30½	9	3500	Devonp'rt	Hawthorn.	1894	1895	72,313	..	2	2 *4·7-in.*, 5 *6-pr.*, M. .	5	19·0	100	120
P. 2nd cl Cr.	Isis . . shd.	5600	350	54	21	9600	Glasgow .	London and Glasgow Co.	1896	1898	253,733	2½	3	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 5 M., 1 l.	3 (2 sub.)	19·5	550	449
,, ,,	Juno . shd.	5600	350	54	21	9600	Barrow .	Vickers .	1895	1898	256,106							
,, ,,	Liverpool . .	4800	430	47	15¼	24,614 Y.	Barrow .	Vickers P.T.	1909	1910	344,871*	2–1	..	2 *6-in.*, 10 *4-in.* B.L., 1 *12-pr.*, 4 M.	2	26·17 *t*	650	376
,, ,,	Lowestoft† .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3rd cl. Cr. .	Medea . .	2800	265	41	16½	7500 Y.	Chatham.	Humphrys	1888	1889 1905	171,874	..	1½	6 *4·7-in.*, 13 *6-pr.*, *3-pr.*, M.	4	19·0	400	218
P. 3rd cl. Cr.	Melpomene . (*ex*-Indefatigable) shd.	3600	300	43¾	17½	9000	Glasgow .	London and Glasgow Co.	1891	1892	183,568	2–1	2	2 *6-in.*, 6 *4·7-in.*, 13 *6-pr.*, *3-pr.*, M.	3	19·75	400	273

* Total estimated cost of ship, including guns.

† Details not published.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
P. 2nd cl. Cr.	**Minerva** . shd.	5600	350	53	$20\frac{1}{2}$	9600	Chatham .	Chatham .	1895	1897	275,331	$1\frac{1}{2}$-3	3	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 5 M., 1 l.	3 (2 sub.)	19·5	550	416
,, ,,	**Newcastle** .	4800	430	47	$15\frac{1}{4}$	24,669 Y.	E'swick .	Wallsend Engineering Co. P.T.	1909	1910	352,610*	2–1	..	2 *6-in.*, 10 *4-in.* B.L., 1 *12-pr.*, 4 M.	2	26·26 *t*	650	376
,, ,,	**Nottingham**† .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P. Scout .	**Pathfinder**	2940	370	$38\frac{3}{4}$	14	17,176 L.N.	Birknhd.	Laird .	1904	1905	273,147	$\frac{1}{2}$–$\frac{5}{8}$	..	10 *12-pr.*, 8 *3-pr.* .	2	25·34 *t*	150	268
,, .	**Patrol** .					16,460					273,523					25·06 *t*	380	
P. 3rd cl. Cr.	**Pandora** .	2200	305	$36\frac{3}{4}$	$13\frac{1}{2}$	7000 T.	Portsm'th	Portsm'th	1900	1901	165,218							
,, ,,	**Pegasus** .	2135	300	$36\frac{1}{2}$	17	7000 R.	Jarrow .	Palmer .	1897	1899	134,919							
,, ,,	**Pelorus** .	2135	300	$36\frac{1}{2}$	17	7000 Nor.	Sheerness	Thomson .	1896	1897	154,315							
,, ,,	**Perseus** .	2135	300	$36\frac{1}{2}$	$13\frac{1}{2}$	7000 T.	Hull	Earle .	1897	1901	133,461							
,, ,,	**Pioneer** .	2200	305	$36\frac{3}{4}$	$13\frac{1}{2}$	7000 T.	Chatham.	Fairfield .	1899	1900	148,894	2	·22	8 *4-in.*, 11 *3-pr.*, M. .	2	20·0	250 517	234
,, ,,	**Prometheus** .	2135	300	$36\frac{1}{2}$	$13\frac{1}{2}$	7000 T.	Hull .	Earle	1898	1901	131,743							
,, ,,	**Psyche** .	2200	305	$36\frac{3}{4}$	$17\frac{1}{2}$	7000 T.	Devonp'rt	Devonport	1898	1900	156,890							
,, ,,	**Proserpine** .	2135	300	$36\frac{1}{2}$	17	7000 T.	Sheerness	Devonport	1896	1899	165,020							
,, ,,	**Pyramus** .	2135	300	$36\frac{1}{2}$	$13\frac{1}{2}$	7000 R.	Jarrow .	Palmer .	1897	1900	135,249							
,, ,,	**Philomel** .	2575	265	41	$15\frac{1}{2}$	7500	Devonp'rt	Earle .	1890	1892	163,699	2–1	2	8 *4·7-in.*, 12 *3-pr.*, M.	2	19·0	300	217

P. 2nd cl. Cr.	**Royal Arthur** shd.	7700	360	60	27¾	12,000	Portsm'th	Maudslay .	1891	1893	412,033	5–1	6	1 *9·2-in.*, 12 *6-in.*, 1 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2 (2 sub.)	19·7	850	567
P. 3rd cl. Cr.	**Sapphire** . .	3000	360	40	14½	10,200	Jarrow .	Palmer .	1904	1905	226,277	..	..	12 *4-in.*, 11 *3-pr.*, M. .	2	22·45 t	300	296
,, ,,	**Sappho** . .	3400	300	43	16½	9861	Poplar .	Penn	1891	1893	176,813	2–1	2	2 *6-in.*, 6 *4·7-in.*, *6-pr.*, 13 *3-pr.*, M.	4	20·47	400	273
,, ,,	**Scylla** . .	3400	300	43	16½	9280	Poplar .	Penn .	1892	1893	176,655	2–1	2		4	20·62	400	273
P. Scout .	**Sentinel** . .	2895	360	40	14¼	17,488 Nor. V.E.	Barrow .	Vickers .	1904	1905	276,344	1½–⅝	..	10 *12-pr.*, 8 *3-pr.* . .	2	25·07 t	150 / 410	268
P. 3rd cl. Cr.	**Sirius** . shd.	3600	300	43¾	17½	9000	Elswick .	Maudslay .	1890	1892	190,991	2–1	2	2 *6-in.*, 6 *4·7-in.*, 13 *6-pr.*, *3-pr.*, M.	4	19·75	400	273
P. Scout .	**Skirmisher** .	2895	360	40	14¼	17,053 Nor.	Barrow .	Vickers .	1905	1905	276,579	1½–⅝	..	10 *12-pr.*, 8 *3-pr.* .	2	25·19	150	268
P. 2nd cl. Cr.	**Southampton** .	5400	430	49¾	15¾	25,000 Y.	Clydeb'nk	J. Brown . C.T.	Bldg.	..	333,078*	..	..	8 *6-in.*, 4 *3-pr.*, 4 M., 1 l.	2	25·5	650	..
P. 1st cl. Cr.	**Spartiate** . shd.	11,000	435	69	26	18,658	Pembroke	Maudslay .	1898	1902	654,661	4–2½	4½–2	16 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 2 M.	2 (2 sub.)	21·0 t	1000	600
T. B. D. .	**Swift.** . .	1800	345	34 1/6	10½	30,000 L.Y.	Birkenh'd	Cammell Laird	1907	1909	241,595*	..	..	4 *4-in.*	..	35·25	180 Oil	150
P. 2nd cl. Cr.	**Talbot** . shd.	5600	350	53½	21	9600	Devonpr't	Devonport	1895	1897	263,699	1½–3	3	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 5 M., 1 l.	3 (2 sub.)	19·5	550	412
P. 1st cl. Cr.	**Terrible** . shd.	14,200	500	71	27	25,000 B.	Glasgow .	Thomson .	1895	1898	708,619	3–6	6	2 *9·2-in.*, 16 *6-in.*, 14 *12-pr.*, 14 *3-pr.*, 9 M.	4	22·4	1500 / 3000	840
P. 2nd cl Cr.	**Theseus** . .	7350	360	60	23¾	12,000	Blackwall	Maudslay .	1892	1894	370,359	5–1	6	2 *9·2-in.*, 10 *6-in.*, 1 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2 (2 sub.)	20·0	850	544
P. 3rd cl. Cr.	**Topaze** . .	3000	360	40	14½	9860 L.N.	Birkenh'd	Laird .	1903	1905	242,444	..	..	12 *4-in.*, 11 *3-pr.*, M. .	2	22·1 t	300	296

* Total estimated cost of ship, including guns.

† Details not published.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
P. 2nd cl. Cr.	**Venus** . shd.	5600	350	54	21¼	9600	Govan .	Fairfield .	1895	1898	254,184	2½	3	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 5 M., 1 l.	3 (2 sub.)	19·5	550	449
" "	**Vindictive** .	5750	320	54	20½	10,000 B.	Chatham	Chatham .	1897	1897	282,879	1–2 N.S.	3	10 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 5 M., 1 l.	2	20·1	500	429
" "	**Weymouth**	5250	430	48½	15½	22,000 Y.	Elswick	Parsons P. T.	1910	1911	337,738*	..	..	8 *6-in.*, 4 *3-pr.*, 4 M. .	2	25·5 *t*	650	390
" "	**Yarmouth**						Glasgow	London & Glas. Co. C. T.	1911	1912	353,238*							
	8 "light armoured cruisers"†	Details not published					1 Chatham, 1 Pembroke, 6 by contract		Pro.									

* Total cost, including guns. † Programme 1912–13.

River Gunboats.—**Robin, Nightingale, Snipe, Sandpiper** (1897), 85 tons; **Woodcock, Woodlark** (1898), 150 tons, 2 6-prs., 4 Maxims; **Kinsha** (1901), 616 tons, **Teal, Moorhen** (1902), 180 tons, 2 6-prs., 13 knots; **Widgeon** (1905), 195 tons. *Despatch Vessels.*—**Alacrity** and **Surprise** (1885), 1,700 and 1,650 tons. *Torpedo Gunboats* (some serving as mine sweepers).—**Circe, Gossamer, Dryad, Halcyon, Harrier, Jason, Leda, Niger, Seagull, Skipjack, Spanker, Speedwell,** and **Speedy.**

The following vessels have been struck off the effective list, but the armaments have not in every case been removed :—*Cruisers :* **Powerful, Furious,** and **Terpsichore.** The following small craft have been placed on a "Special Service List" of "unprotected ships": **Sphinx, Lapwing, Redbreast** (East Indies), **Ringdove** (Fishery P.), **Pomone** (special service), **Dwarf** (W. C. Africa), **Shearwater** (British Columbia), **Bramble, Britomart, Thistle, Clio,** and **Cadmus** (China).

The following vessels are employed on special service :—**Assistance** and **Cyclops,** fleet repair ships; **Blake, Blenheim, Hecla, Leander, St. George,** and **Tyne,** torpedo depot ships; **Arrogant, Bonaventure, Forth, Mercury, Pactolus, Thames, Vulcan, Dolphin, Onyx, Antelope, Hebe, Sharpshooter,** and **Hazard,** submarine depôt ships; **Aquarius,** distilling vessel; **Iphigenia, Apollo, Naiad, Intrepid, Andromache, Latona,** and **Thetis,** mine-laying vessels; and **Seaflower, Seamew, Sparrow, Spider,** and **Driver,** steam-trawlers for mine-sweeping duties, purchased April, 1909.

Defence Forces of the Dominions.

AUSTRALIA.

Class.	Name.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
b.c. . .	Australia .	18,800	555	80	26½	43,000	Clydebank	J. Brown .	1911	..	..	..	..	8 *12*-in., 16 *4-in.* .	2	25·0	1000	..
P. 2nd cl. Cr.	Melbourne	5400	430	49½	15¾	25,000	Birkenhead	P.T. Cammell Laird	Bldg.	..	..	..	..	8 *6*-in., 4 *3-pr.*, 4 M., 1 T.	2	25·5	..	..
.. ..	Sydney .						Glasgow	London & Glasgow Co.	Bldg.	..								
.. ..	Brisbane .	Details		not		published	Sydney	..	Bldg.	..	..	..	..	..	..	..	..	..

CANADA.

Class.	Name.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
P. 1st cl. Cr	Niobe .	11,000	435	69	26	16,500	Barrow .	Vickers .	1897	1899	..	..	..	16 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 2 M.	2	20·5	1000	600
P. 2nd cl. Cr.	Rainbow . shd.	3600	300	43¾	17½	9000	Jarrow .	Palmer .	1891	1893	..	..	..	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 T.	4	19·7	400	273

Royal Naval Reserved Merchant Cruisers.

——	Name.	Owners.	Length.	Breadth.	Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
			Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an annual subvention and permitted to fly the blue ensign.	Mauretania	Cunard Co.	785	88	33·6	31,938	68,000	26·6* t
	Lusitania	,, ...	785	88	33·6	31,550	68,000	26·6* t

* Speed of best day's run, 1910.

In addition to the above, the Cunard Company holds all vessels for the time being the property of the Company at the disposal of His Majesty's Government for hire or purchase.

ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Garibaldi . .	6732	328	59¾	24	13,384	Sestri Ponente	1895	1896	752,000	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 4 *2·2-in.*, 2 M.*	..	19·9 *t*	1000	500
a.c.	General Belgrano .	7069	328	59¾	24	13,000	Leghorn .	1897	1899	696,700	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 14 *6-in.*, 2 *3-in.*, 4 *2·2-in.*, 2 L., 2 M.*	4	20·1 *t*	1000	500
a.c.	General San Martin	6773	328	59¾	24	13,000	Leghorn .	1896	1898	688,200	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	4 *8-in.*, 10 *6-in.*, 6 *4·7-in.*, 4 *2·2-in.*, 2 L., 2 M.*	4	19·8	1100	500
c.d.s.b.	Independencia .	2336	230	44¼	13	3000	Birkenhead .	1891	1893	176,000	8 *comp.*	2	..	8 *comp.*	8 *comp.*	..	2 *9·4-in.*, 4 *4·7-in.* (A), 4 *3-pr.* (A), 4 M.	..	14·4 *t*	340	225
c.d.s.b.	Libertad . . .	2336	230	44¼	13	3000	Birkenhead .	1890	1892	176,000											
b.	Moreno . . / Rivadavia .	27600†	585	98	27½	39,500 B. & W. Curtis t.	Quincy, Mass. / Camden, N.J. (N.Y.S. Co.)	1911	..	2,200,000	12–10 K.S.	3–2	9–6 K.S.	9 K.S.	12–9 K.S.	6 K.S.	12 *12-in.*, 12 *6-in.*, 16 *4-in.*, 10 smaller.	2 sub.	22½	1600 4000	1046
a.c.	Pueyrredon . .	6773	328	59¾	24	13,000 B.	Sestri Ponente	1898	1901	782,000	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 4 *2·2-in.*, 2 M.*	4	20·1 *t*	1000	500

* Have Armstrong guns; are being reboilered, 1911–12. Some of the smaller guns removed.

† Normal; 30,000 tons full load; oil fuel is 600 tons.

ARGENTINE REPUBLIC.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Buenos Aires shd.	4780	396	47¼	19	17,000	Elswick	1895	1895	383,000	..	4½	2 *8-in.* (A.), 4 *6-in.*, 6 *4·7-in.*	3	23·2* *t*	1000	429
to.g.b.	Espora	520	210	25	8	3500 Y	Birkenhead	1890	1891	..	..	..	2 *3-in.*, 4 *1·8-in.*, 2 M.	5	20·0	180	124
cr.	Nueve de Julio	3570	354	44	19½	14,350	Elswick	1892	1892	293,000	4½	4½	4 *6-in.* (A.), 8 *4·7-in.*, 1 *3-pr.*	5	22·74 *t*	770	300
to.g.b.	Paraná	1000	240	32¼	7½	..	Elswick	1908	1909	..	1	3-2†	2 *6-in.* Howitzers, 6 *12-pr.*, 8 M., 4 *12-pr.* field.	..	15·0	120	150
to.g.b.	Patria	1070	250	31	10	4500	Birkenhead	1893	1894	87,600	..	..	2 *4·7-in.*, 4 *8-pr.*, 2 *3-pr.*, 2 M.	5	20·75 *t*	288	159
to.g.b.	Rosario	1000	240	32¼	7½	..	Elswick	1908	1909	..	1	3-2†	2 *6-in* Howitzers, 6 *12-pr.*, 8 M., 4 *12-pr.* field.	..	15·0	120	150
cr.	25 de Mayo	3200	325	43	16	13,800	Elswick	1890	1892	260,000	4½	4½	2 *8·2-in.* (A.), 8 *4·7-in.*, 1 *3-pr.*	6	22·43 *t*	600	185

* Natural draught. † Side.

The training-ship (cruiser) Presidente Sarmiento, 2750 tons, 2000 I.H.P. (locomotive and Niclausse boilers), and 13 knots speed, with 19 guns and three torpedo tubes; launched by Messrs. Laird, 1897. There are several other small gunboats and old vessels.

AUSTRIA-HUNGARY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Arpád Babenberg	8208	354¼	65¾	23¼	15,000 B.	Trieste	1901 1902	1903 1904	650,900 667,000	8½ K.S.	2½	4 K.S.	8 K.S.	8¼ K.S.	5 K.S.	3 *9·4-in.*, 12 *5·9-in.*, 10 *2·8-in.*, 8 M., 2 l.	2 (sub)	19·6 t	500 840	638
c.d.s.	Budapest	5462	305	55¾	21	9185 B.	Trieste	1896	1897	400,600	10½ H.S.	2½	3¼ H.S.	8 H.S.	10½ H.S.	3¼ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 12 *1·8-in.*, 6 M., 2 l.	4	17·8 t	500	450
b. b. b.	Erz. Friedrich Erz. Karl Erz. Ferdinand Max	10433	390½	72¼	24½	18,130 t 18,000 Y.	Trieste	1904 1903 1905	1906 1906 1907	912,500	8¼ K.S.	3	5 K.S.	8 K.S.	9¼ K.S.	7 K.S.	4 *9·4-in.*, 12 *7·5-in.*, 12 *2·8-in.*, 6 *1·8 in.*, 8 M., 2 l.	2 sub.	20·56 t 20·36 t 20·0	1315	..
b.	Erz. Franz Ferdinand	14226	450¾	80½	26½	26,000 Y. t	Trieste	1908	1910	..	9–7½ K.S.	2	6 K.S.	6 K.S.	10 K.S.	8 K.S.	4 *12-in.*, 8 *9·4-in.*, 20 *3·9-in.*, 6 *12-pr.*, 2 M.	3 sub.	20·6 t	750 1200	816
b.	Habsburg	8208	354¼	65¾	23¼	15,000 B.	Trieste	1900	1902	626,000	8½ H.S.	2½	4 H.S.	8 H.S.	8¼ H.S.	5 H.S.	3 *9·4-in.*, 12 *5·9-in.*, 10 *2·8-in.*, 8 M., 2 l.	2 (sub)	19·6 t	500 840	638
a.c	Kaiserin Maria Theresia	5187	351	52½	21¼	9755	Trieste	1893	1895 1910	304,187	4	2	..	4	4	4	2 *7·5-in.*, 8 *5·9-in.*, 2 *2·8-in.*, 14 *1·8-in.*, 5 M., 2 l.	4	19·0	740	502
a.c	Kaiser Karl VI.	6151	367½	56	20¼	12,800 B.	Trieste	1898	1900	429,000	10 H.S.	1½	6 H.S.	8 H.S.	8¾ H.S.	6 H.S.	2 *9·4-in.*, 8 *5·9-in.*, 16 *1·8-in.*, 4 M., 2 l.	4	20·7 t	800	535
c.d.s.	Monarch	5550	305	55¾	21	8900	Pola	1895	1898	399,062	10½ H.S.	2½	3¼ H.S.	8 H.S.	10½ H.S.	3¼ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 12 *1·8-in.*, 6 M., 2 l.	4	17·4 t	500	450
b.	Radetzky	14226	450¾	80½	26½	20,000 Y.	Trieste	1909	1910	..	9–7½ K.S.	2	6 K.S.	6 K.S.	10 K.S.	8 K.S.	4 *12 in.*, 8 *9·4-in.*, 20 *3·9-in.*, 6 *12-pr.*, 2 M.	3 sub.	20·5	750 1200	816
a. c.	St. Georg	7185	383¾	61¾	21¼	15,270 t, Y.	Pola	1903	1906	581,583	8¼–6½ K.S.	1½	5 K.S.	7 K.S.	8¼–5¼ K.S.	6 K.S.	2 *9·4-in.*, 5 *7·5-in.*, 4 *5·9-in.*, 9 *2·8-in.*, 14 M., 2 l.	2 (sub)	22 t	1000	..
b.	Tegetthoff Viribus Unitis "No. VI." "No. VII."	20000	495	89½	27	25,000 Y. tur.	Trieste Trieste Trieste Fiume	1912 1911 Bldg. Bldg.	..	2,500,000	11–4¾ K.S.	2½	6 K.S.	..	12 K.S.	6 K.S.	12 *12-in.*, 12 *5·9-in.*, 18 *12-pr.*, 6 smaller	4	20·5	900 2000	1000
c d.s.	Wien	5550	305	55¾	21	8480	Trieste	1895	1897	397,850	10½ H.S.	2½ H.S.	3¼ H.S.	8 H.S.	10½ H.S.	3¼ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 12 *1·8-in.*, 6 M., 2 l.	4	17·6 t	500	450
b.	Zrinyi	14226	450¾	80½	26½	20,000 Y.	Trieste	1910	1911	..	9–7½ K.S.	2	6 K.S.	6 K.S.	10 K.S.	8 K.S.	4 *12-in.*, 8 *9·4-in.*, 20 *3·9-in.*, 6 *12-pr.*, 2 M.	3 sub.	20·5	750 1200	816

Six armoured river monitors, Bodrog, Körös, Leitha, Maros, Szamos, and Temes, of 300–437 tons displacement.

AUSTRIA-HUNGARY.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
to. cr.	Admiral Spaun*	3500	416¾	42	15½	21,000 Y. tur.	Pola	1909	1910	..	1	..	7 *3·9-in.*, 2 M.	2	26·0	450 850	..
to. cr.	Aspern	2362	301¾	39½	14¼	7300 Y	Pola	1899	1901	155,000	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·0	470 500	289
to. g. b.	Blitz	354	193½	22¼	8	3500	Elbing	1888	1889	..	..	..	8 *1·8-in.*	4	21·0	250	59
cr. 2nd cl.	Kaiserin Elizabeth	4000	321½	47½	18½	8000	Pola	1890	1892	..	2¼	3½	2 *9·4-in.* (K.), 6 *5·9-in.* do., 13 *1·8-in.*, 4 M., 2 l.	5	19·0	660	418
cr. 2nd cl.	Kaiser Franz Josef I.	3966	321½	47½	18½	8000	Trieste	1889	1891	..	2¼	3½	2 *9·4-in.* (K.), 6 *5·9-in.* do., 16 *1·8-in.*, 2 l.	5	19·0	660	426
to. g. b.	Komet	354	193½	22¼	8	3500	Elbing	1888	1889	..	..	..	9 *1·8-in.*	4	21·0	50	59
to. g. b.	Magnet	502	220	26¾	8	5000 T	Elbing	1896	1899	51,052	..	..	6 *1·8-in.*	3	26·0 *t*	105	80
to. g. b.	Meteor	344	187	22¼	8	3500	Elbing	1887	1889	..	..	..	9 *1·8-in.*	4	23·1	120	59
Mining	Pelikan	2431	279	39¼	15½	4600	Elbing	1891	1893	..	..	..	2 *5·9-in.* (K.), 8 smaller	4	18·0	..	198
to. g. b.	Planet	492	210	23	8¼	3500	Jarrow	1889	1890	..	..	..	2 *2·8-in.*, 8 *1·8-in.*	3	19·6	78	84
to. g. b.	Satellit	531	220	26¾	9¼	4000	Elbing	1893	1893	..	1½	..	1 *2·8-in.*, 8 *1·8-in.*	..	21·87	76	84
to. cr.	Szigètvâr	2313	301¾	39½	14¼	7300 Y.	Pola	1899	1901	155,000	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·0	470 500	289
to. g. b.	Trabant	522	220	23	8¼	3500	Trieste	1890	1891	..	..	..	2 *2·8-in.*, 8 *1·8-in.*	3	20·0	..	84
to. cr.	Zenta	2264	301¾	39½	12¼	7300 Y.	Trieste	1897	1899	143,780	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·9 *t*	470 500	289
to. cr.	G, H, J	3500	416¾	42	15½	25,000 Tur.	Monfalcone, Fiume	Bldg. Pro.	..	..	1	..	7 *3·9-in.*, 2 M.	2	27·0	450 850	..

* 2¼ in. side armour and 2 in. bulkhead.

Donau, training corvette, launched at Pola, 1893 (2307 tons). A submarine depôt and salvage vessel, 950 tons, 15 knots. Tender and repair ship for flotillas, Gaea (*ex* Fürst Bismarck).

BRAZIL.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkheads.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in	in.	in.	in.			knots.	tons.	
c.d.s., t.	Marshal Deodoro	3112	267½	48	13¼	3400 D'A.	La Seyne	1898	1900	..	13¾–4 H.S.	1½	..	..	8 H.S.	3 H.S.	2 9·4-in., 4 4·7-in., 2 M., 4 6-pr., 2 1-pr.	2 (sub.)	15·0	236	200
c.d.s., t.	Marshal Floriano							1899	1901												
b.	Minas Geraes .	19,281	500	83	25	27,212 t B.&W.	Elswick .	1908	1909	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9	12–8 K.S.	9 K.S.	12 12-in., 22 4·7-in., 8 3-pr.	4	21·4 t	900 2400	900
b.	Rio de Janeiro	27,500	632	89	27	45,000 B.&W. P. tur.	Elswick .	Bldg.	..	..	9 K.S.	2–1	9–6 K.S.	..	9 K.S.	6 K.S.	14 12-in., 20 6-in., 10 3-pr.	3 (sub.)	22	1500 3000	1100
b.	São Paulo .	19,281	500	83	25	28,645 t B.&W.	Barrow .	1909	1910	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9	12–8 K.S.	9 K.S.	12 12-in., 22 4·7-in., 8 3-pr.	4	21·6 t	900 2400	900

Also river monitors Maranhao and Pernambuco, built at Rio de Janeiro. Two armoured gunboats projected. Two monitors, 335 tons.

BRAZIL.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Almirante Tamandare	4660	294	46	$18\frac{1}{4}$	7500	Brazil	1890	1893	..	$1\frac{1}{2}$	3	10 *6-in.*, 2 *4·7-in.*, 8 M.	8	17·0	750	450
,,	Bahia *	3100	380	39	$13\frac{1}{2}$	17,500 tur.	Elswick	1909	1910	328,500	$\frac{3}{4}$–$1\frac{1}{2}$	..	10 *4·7-in.*, 8 *1·8-in.*	2	27·0 t	650	260
,,	Barroso	3600	330	$43\frac{3}{4}$	$16\frac{3}{4}$	7500	Elswick	1896	1897	..	3	$4\frac{1}{2}$ shields	6 *6-in.*, 4 *4·7-in.*, 10 *6-pr.*, 4 *1-pr.*, 4 M.	3	20·0	700	300
,,	Benjamin Constant	2707	236	46	18	2800	La Seyne	1892	1894	..	2	..	4 *6-in.*, 8 *4·7-in.*, 8 M., 4 l.	4	14·0	260	287
to.g.b.	Gustavo Sampaio	500	197	21	$7\frac{3}{4}$	2500	Elswick	1893	1894	..	..	..	2 *20-pr.*, 4 *7-pr.*	3	18·0	150	95
cr.	Republica †	1300	210	35	13	750	Elswick	1892	1894	..	2–1	..	6 *4·7-in.*, 4 *6-pr.*, 6 M.	4	17·0	170	160
,,	Rio Grande do Sul	3100	380	39	$13\frac{1}{2}$	17,500 tur.	Elswick	1909	1910	328,500	..	..	10 *4·7-in.*, 8 *1·8-in.*	2	27·4 t	650	260
to.cr.	Tamoyo	1063	269	$28\frac{3}{4}$	$9\frac{3}{4}$	6500	Kiel	1898	1900	..	..	$4\frac{1}{2}$ shields	2 *4·1-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	23·0	293	110
,,	Timbira	1014	$249\frac{1}{2}$	$30\frac{3}{4}$	$10\frac{1}{4}$	7000	Kiel	1896	1897	..	$\frac{1}{2}$	$4\frac{1}{2}$ shields	2 *4·1-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	22·5	250	110
g.r.	Tiradentes	800	165	30	11	1200	Elswick	1892	1893	..	..	..	4 *4·7-in.*, 3 *6-pr.*, 4 M.	2	14·5	110	107
to.cr.	Tupy	1014	$249\frac{1}{2}$	$30\frac{3}{4}$	$10\frac{1}{4}$	7000	Kiel	1896	1897	..	$\frac{1}{2}$	$4\frac{1}{2}$ shields	2 *4·1-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	22·5	250	110

Eleven screw gunboats, 200 tons to 400 tons, and four 12-knot river gunboats built at Poplar. Two river gunboats built by Messrs. Yarrow were sent out in sections, 1907.

* The Ceara, a sister-ship of the Bahia, is to be built.

† To be converted into a mine-layer. Another mine-layer is to be built.

CHILI.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
a.c.	Almirante O'Higgins shd.	8500	$411\frac{3}{4}$	$62\frac{1}{2}$	22	16,000 B.	Elswick .	1897	1898	..	7–5	2	..	..	$7\frac{1}{2}$–6	6	4 *8-in.*, 10 *6-in.*, 4 *4·7-in.*, 10 *12-pr.*, 10 *6-pr.*, 4 M.	3 (2 sub.)	21·5 *t*	1260	..
b.	Capitão Prat . . .	5981	328	$60\frac{3}{4}$	$21\frac{3}{4}$	12,000	La Seyne	1890	1893	391,000	12	3	4	..	$10\frac{1}{2}$	2	4 *9·4-in.* (Canet), 8 *4·7-in.* (Canet), 10 *12-pr.*, 14 smaller and M.	4	18·3 *t*	775	400 1100
a.c.	Esmeralda . . .	7020	436	$53\frac{1}{4}$	$22\frac{1}{4}$	16,000	Elswick .	1896	1897	..	6 H.S.	2	..	6 H.S.	$4\frac{1}{2}$ Shields	..	2 *8-in.*, 16 *6-in.*, 8 *12-pr.*, 2 *3-pr.*, 4 M.	3 (2 sub.)	22·8 *t*	1350	500
b.	Valparaiso . . .	28,000	..	..	..	45,000 tur.	Elswick .	Bldg.	..	..	..	..	..	..	..	..	10 *14-in.*, 22 *4·7-in.* .	..	23	1000 3500	..

Capitão Prat reconstructed.

Cruising Ships, &c.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
to.g.b / ,,	Almirante Condell . / Almirante Lynch .	750	240	$27\frac{1}{2}$	$10\frac{1}{2}$	4500 B.	Birkenhead .	1890	1892	..	..	..	3 *14-pr.*, 4 *3-pr.*, 2 M. .	5	21·0	210	..
cr.	Blanco Encalada .	4400	370	$46\frac{1}{2}$	$18\frac{1}{2}$	14,500	Elswick .	1893	1894	..	4–$1\frac{3}{4}$	..	2 *8-in.*, 10 *6-in.*, 12 *3-pr.*, 10 *1-pr.**	5	22·78 *t*	900	427
,,	Chacabuco . . .	4500	360	46	18	15,750	Elswick .	1901	1903	..	$4\frac{1}{2}$–$1\frac{3}{4}$	..	2 *8-in.*, 10 *4·7-in.*, 16 *1·8-in.*, 2 M., 1 l.	5	23·0	1000	..
,,	General Baquedano (Training)	2330	240	$45\frac{3}{4}$	18	1500 B.	Elswick .	1898	1900	..	..	..	4 *4·7-in.*, 2 *12-pr.*, 2 *6-pr.*, 2 M., 1 l.	1	13·7 *t.*	300	302
,,	Ministro Zenteno .	3600	$330\frac{1}{4}$	$43\frac{3}{4}$	$16\frac{3}{4}$	6500	Elswick .	1896	1898	..	..	..	8 *6-in.*, 10 *6-pr.*, 4 *1-pr.** .	3	20·0*t*	800	..
,,	Presidente Errázuriz	2047	268	$35\frac{3}{4}$	$19\frac{1}{2}$	5400	La Seyne	1890	1892	..	$3\frac{1}{2}$	..	4 *6-in.* (Canet), 2 *5-in.*, 4 *2·2-in.*, 6 M.	3	19·0	200	171

* Armstrong.

Two Gunboats of 145 tons displacement and one of 180 tons.

CHINA.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			kts.	tons.	
cr.	Chao Hao	2750	330	42	13¼	6000 P. tur.	Elswick	1911	..	..	¾	..	2 *6-in.*, 4 *4-in.*, 2 *3-in.*, 6 *3-pr.*, 2 l.	2	22·0	150 550	330
cr.	Foo-Ching	2500	253	36¼	18	2400	..	1893	1895	..	4–2	4½	3 *5-in.* (K.), 4 M., 2 l.	..	16·0	..	..
to.g.b.	Fei-Ying	837	257¼	28½	12½	4500 Y.	Stettin	1895	1895	..	..	2	2 *4-in.*, 6 *3·4-in.*, 4 smaller	3	21·8 *t*	75	90
cr.	Hai-Chi	4300	396	46¾	18½	17,000	Elswick	1898	1899	..	5	6	2 *8-in.*, 10 *4·7-in.*, 12 *3-pr.*, 4 *1·4-in.*, 6 M.	5	24·0	300	374
,,	Hai-Shen	2903	314¾	41	16	8000	Vulcan, Stettin	1898	1898	..	3	2	3 *6-in.* (K.), 8 *4-in.*, 6 *1·4-in.* Hotchkiss, 6 M.	3 (1 sub.)	20·7 *t*	220 500	244
,,	Hai-Shew							1897	1898								
,,	Hai-Yung							1897	1898								
,,	Hi-Ying	2165	253	36¼	18	2400	..	1895	1897	..	..	..	2 *8-in.* (A.), 8 *4·7-in.*, 4 M.	1	21·0	..	..
to.cr.	Kien-Wei	861	256	26½	10½	7000 N.S.	Foochow	1900	1902	..	..	..	1 *3·9-in.*, 3 *2·5-in.*, 6 *1·4-in.*	2	22·5	360	300
..	Kien-Gnan						Foochow	1899	1902	..	..	..					
to.g.b.	Kwang-Ting	1000	235	27½	11¼	3400	..	1890	1892	..	..	..	3 *4·7-in.*, 4 M., 2 l.	4	16·0	..	120
g.b.	Tchu-Tai	552	..	..	..	..	Kobe	1906	..	..	..	..	2 *4·7-in.*, 2 *12-pr.*	..	13·0	..	..
cr.	Ying Swei	2500	330	42	13	6000	Barrow	1911	..	..	¾	..	2 *6-in.*, 4 *4-in.*, 2 *3-in.*, 6 *3-pr.*, 2 l.	2	22·0	150 550	330

A protected cruiser of 4500 tons is being built by the New York Shipbuilding Co. Ten river gunboats (570 tons) and one smaller have been built in Japan. A river gunboat of 150 tons is being built at the Germania Yard, Kiel. At the Kawasaki Yard, Kobe, the Kiang Heng, Jsu Jang and another small cruiser, or gunboat, have lately been built. Admiralty yacht Wufong, 14 knots, built at Kiao-chau.

DENMARK.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.,t.	**Herluf Trolle** .	3415	271	50	$16\frac{1}{4}$	4200 T.	Copenhagen	1899	1901	..	8–4 H.S	2	7 H.S.	..	6 H.S.	6 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·2-in.*, 8 smaller.	3 (sub.)	16·0	250	250
b.	**Iver Hvitfeldt** .	3208	242	$49\frac{1}{2}$	18	5100	Copenhagen	1886	1889 1900	200,000	12	2	..	$9\frac{1}{2}$	8	..	2 *10·2-in.* (K.), 10 *6-pr.*, 8 M.	4 (1 sub.)	15·6	250	298
c.d.s.,t.	**Olfert Fischer** .	3415	271	50	$16\frac{1}{4}$	4200	Copenhagen	1903	1905	..	8–4 K.S.	2	7 K.S.	..	6 K.S.	6	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·2-in.*, 8 smaller.	3 (sub.)	16·0	250	250
c.d.s.,t.	**Peder Skram** * .	3543	$274\frac{1}{4}$	$51\frac{1}{2}$	$16\frac{1}{4}$	4600	Copenhagen	1908	1909	..	8–4 K.S.	2	..	..	7 K.S.	6 K S.		4	16·5	250	250
c.d.s.,t.	**Skjold** . .	2115	$226\frac{1}{2}$	38	$13\frac{1}{2}$	2200 T.	Copenhagen	1896	1899	..	9	2	..	7	8	$4\frac{1}{2}$	1 *9·4-in.*, 3 *4·7-in.* (K.), 4 *1·8-in.*, 1 M.	4	13·0	280	210

* Another vessel of the class is provided for. Three armoured gunboats of a new class are intended to be built.

DENMARK.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.				tons.	
3rd cl. *cr.*	**Geiser** . . .	1260	$257\frac{1}{2}$	$27\frac{1}{2}$	$11\frac{1}{4}$	3000 T.	Copenhagen .	1892	1893	..	$1\frac{1}{2}$	..	2 *4·7-in.*, 4 *3·4-in.*, 6 M. .	4	17·1 *t*	125	155
„	**Heimdal** . .	1260	$257\frac{1}{2}$	$27\frac{1}{2}$	$11\frac{1}{4}$	3000 T.	Copenhagen .	1894	1896	..	$1\frac{1}{2}$	..	2 *4·7-in.*, 4 *3-pr.*, 6 M. .	4	17·5	125	155
„	**Hekla** . . .	1260	233	$32\frac{3}{4}$	$11\frac{1}{4}$	3000 T.	Copenhagen .	1890	1893	..	$1\frac{1}{2}$	..	2 *6-in.*, 4 *2·2-in.*, 6 M. .	4	17·0	125	155

Two obsolete cruisers, Fyen (2580 tons) and Valkyrien (2854 tons).

FRANCE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Aube** (Amiral)	9856	453	66¼	21½	22,155 *t.* B.	St. Nazaire	1902	1904	973,440	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 20 small Q.F. and M.	2 (sub.)	21·9 *t*	970 1590	615
t.	**Bouvet**	12,007	401¼	70¼	27½	14,000 B.	Lorient	1896	1898	1,100,770	15¾–8 H.S.	3½	4 H.S.	..	14½ H.S.	4 H.S.	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 8 *3·9-in.*, 19 small Q.F. and M.	2 (sub.)	18·2 *t*	621	621
t.	**Bouvines**	6691	293¾	58¼	23¼	8400 A'D.	La Seyne	1892	1894	594,640	17¾	4	..	..	14½	..	2 *12-in.*, 8 *3·9-in.*, 4 *1·8-in.*, 10 *1·4* in. M.	2	16·05 *t*	300	323
t.	**Brennus**	11,190	361	67	26¼	14,000 B.	Lorient	1891	1893	991,767	15¾ *comp.*	4	4¾ *comp.*	..	17¾ *comp.*	4¾ *comp.*	3 *13·4-in.*, 10 *6·4-in.*, 23 small Q.F. and M.	4	17·1 *t*	800	696
b.	**Bretagne**	23,600	546	88½	29	28,000 tur.	Brest	Pro.	..	..	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 22 *5·5-in.*	4 (sub.)	19·0	..	..
a.c.	**Bruix**	4735	365¼	46	19¾	9049 B.	Rochefort	1894	1896	409,622	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *5·5-in.*, 4 *2·5-in.*, 4 *1·8-in.*, 4 *1·4-in.*, M.	4	18·3 *t*	406	391
t.	**Carnot**	11,954	382¼	70½	27¼	16,300 *t.* D'A.	Toulon	1894	1897	1,070,088	17¾–9 *comp.*	2¾	4	..	14½	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 16 *1·8-in.*, 10 *1·4-in.*, and M.	2 (sub.)	17·86 *t*	705	625
b.	**Charlemagne**	11,108	385½	66½	27½	14,500 B.	Brest	1895	1898	1,096,432	15¾ H.N.	3½	3 H.N.	..	15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	2 (sub.)	18·1 *t*	680 1100	631
t.	**Charles Martel**	11,693	392½	71	27½	14,996 *t.* D'A.	Brest	1893	1897	1,092,830	17¾	3½	4	..	15¾	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 14 *1·8-in.*, 5 *1·4-in.*	2 (sub.)	18·1 *t*	677	632
a.c.	**Charner** (Amiral)	4702	348	46	19¼	8300 B.	Rochefort	1893	1895	353,200	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *5·5-in.*, 14 small Q.F. and M.	4	18·2 *t*	413	375
a.c	**Condé**	9856	453	63¾	24½	22,175 Nic.	Lorient	1902	1904	863,799	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·4 *t*	970 1590	615
b.	**Condorcet**	18,028	476	84	27	22,500 N. tur.	St. Nazaire	1909	1911	2,165,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12 pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·8 *t*	960 2010	690
b.	**Courbet**	23,100	546	88½	29	28,000 N. tur.	Lorient	1911	..	2,603,920	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*	4 (sub.)	20·0	900 2700	998
b.	**Danton**	18,028	476	84	27	22,500 B. tur.	Brest	1909	1911	2,068,000	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	20·18 *t*	960 2010	690

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft					£	in.	in.	in.	in.	in.	in.			knots.	tons	
b.	**Démocratie** .	14,635	438¾	79½	27½	19,190 B.	Brest .	1904	1907	1,473,180	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·44 *t*	905 1285	793
a.c.	**Desaix** . shd.	7578	426½	58¼	24¼	17,715 *t* B.	St. Nazaire	1901	1903	762,759	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·7 *t*	880 1200	531
b.	**Diderot** .	18,028	476	84	27	22,500 N. tur.	St. Nazaire	1909	1911	2,167,000	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·75 *t*	960 2010	690
a.c.	**DupetitThouars**	9367	452¾	63¾	24½	22,000 *t* B.	Toulon .	1901	1905	831,839	6 H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	3¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	22·5 *t*	1020 1600	610
a.c.	**Dupleix** . shd.	7578	426½	58¼	24¼	17,100 B.	Rochefort .	1900	1903	652,354	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·0	880 1200	531
a.c.	**Edgard Quinet**	13,780	515	70¼	27½	39,803 *t* B.	Brest .	1907	1911	1,307,536	6½–3½ K.S.	2½–1¼	5–2 K.S	4¾ K.S.	8 K.S.	4¾ K.S.	14 *7·6-in.*, 20 *2·4-in.*, 2 smaller.	2 (sub.)	23·9 *t*	1242 2300	738
a.c.	**Ernest Renan** .	13,427	515	70½	26¾	37,500 Nic., *t*	St. Nazaire	1906	1909	1,410,000	6¾–4 H.S.	2	5–3 H.S.	4¾	6 H.S.	5 H.S.	4 *7·6-in.*, 12 *6·4-in.*, 16 *9-pr.*, 8 *3-pr.*	2 (sub.)	25·5 *t*	1354 2300	674
b.	**France** . .	23,100	546	88½	29	28,000 N. tur.	La Seyne .	Bldg.	..	2,603,920	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*	4 (sub.)	20·0	900 2,[illegible]00	998
b.	**Gaulois** .	11,105	385½	66½	27½	14,500 B.	Brest .	1896	1899	1,093,925	15¾ H.N.	3½–1½	3 H.N.	..	15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	2 (sub.)	18·0	680 1100	632
a.c.	**Gloire** . .	9856	453	63¾	24½	20,500 Nic.	Lorient .	1900	1904	883,269	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	970 1590	615
a.c.	**Gueydon** . . (Amiral)	9367	459	63¾	24½	20,200 Nic.	Lorient .	1899	1902	817,994	6–3¾ H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	3¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	1020 1600	610
t.	**Henri IV.** .	8807	354½	72	23	11,500 Nic.	Cherbourg.	1899	1902	801,248	11–7 H.S.	3	4¾ H.S.	..	11¾ H.S.	5 H.S.	2 *10·8-in.*, 7 *5·5-in.*, 12 *1·8-in.*, 2 M.	2 (sub.)	17·2 *t*	735 1100	464

t.	**Jauréguiberry** .	11,637	364	72¾	27¾	15,800 D'A.	La Seyne .	1893	1896	1,069,536	17¾	2¾	4	..	14½	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 12 *1·8-in.*, 8 *1·4-in.*, 8 M.	2 (sub.)	18·07 *t*	700	625
b.	**Jean Bart** .	23,100	546	88½	29	28,000 B. tur.	Brest .	1911	..	2,528,888	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*	4 (sub.)	20·0	900 2700	998
a.c.	**Jeanne d'Arc** .	11,092	477¼	63¾	26½	28,000 Guyot	Toulon .	1899	1903	875,847	6–3 H.S.	2·2	3 H.S.	..	6 H.S.	5 H.S.	2 *7·6-in.*, 14 *5·5-in.*, 16 *1·8-in.*, 8 *1·4-in.*, 2 M.	2 (sub.)	21·7 *t*	1400 2000	626
a.c.	**Jules Ferry** .	12,351	480½	70¼	27	28,753 Guyot	Cherbourg	1903	1906	1,169,940	6¾–4 H.S.	2	5–3 H.S.	6	6 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	22·8 *t*	1320 2100	728
a c.	**Jules Michelet**.	12,370	480½	70¼	27	27,700 Guyot	Lorient .	1905	1908	1,204,107	6–4 K.S.	2	5–3 K.S.	6 H.S.	8 K.S.	5 K.S.	4 *7·6-in.*, 12 *6·4-in.*, 24 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	23·2 *t*	1320 2100	724
b.	**Justice** .	14,635	438¾	79½	27½	18,548 Nic. *t.*	La Seyne .	1904	1907	1,670,385	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·43 *t*	905 1825	793
a.c.	**Kléber** . shd.	7578	426½	58¼	24¼	18,000 Nic.	Bordeaux .	1902	1904	770,320	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·2 *t*	880 1200	531
a.c.	**Léon Gambetta**	12,351	480½	70¼	27	27,500 Nic.	Brest .	1901	1904	1,169,910	6¾–4 H.S.	2	5–3 H.S.	6	8 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	23·06 K.	1320 2100	728
b.	**Lorraine** .	23,600	546	88½	29	28,000 tur.	Private yard	Pro.	..	..	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 22 *5·5-in.* .	4 (sub.)	19·0	..	..
a.c.	**Marseillaise** .	9856	453	63¾	24½	20,500 B.	Brest .	1900	1903	881,270	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 2 *2·5-in.*, 18 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	970 1590	615
t.	**Masséna** .	11,735	384¾	66	27	13,500 D'A.	St. Nazaire	1895	1898	1,100,400	17¾–9¾	3½	4 H.S.	16	15¼ 15¾ H. S.	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 8 *3·9-in.*, 12 *1·8-in.*, 12 *1·4-in.*	2 (sub.)	17·1 *t*	630	642
b.	**Mirabeau** .	18,028	476	84	27	22,500 B. tur.	Lorient .	1909	1911	2,032,000	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·73 *t*	960 2010	690
a.c.	**Montcalm** .	9367	452¾	63¾	24½	19,600 N.S.	La Seyne .	1900	1902	902,809	6 H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	2¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	1020 1600	612
b.	**Paris** .	23,100	546	88½	29	28,000 N. tur.	St. Nazaire	Bldg.	..	2,603,920	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*	4 (sub.)	20·0	900 2700	998
b.	**Patrie** .	14,635	438¾	79½	27½	17,859 *t.* Nic.	La Seyne .	1903	1906	1,674,870	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 18 *6·4-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·12 *t*	905 1825	793

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in	in.	in.	in.	in.			kts.	tons.	
b.	Provence	23,600	546	88½	29	28,000 tur.	Lorient	Pro.	..	..	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 22 *5·5-in.*	4 (sub.)	19·0	..	..
b.	République	14,635	438¾	79½	27½	19,626 *t.*Nic.	Brest	1902	1906	1,523,136	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 18 *6·4-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·15	905 / 1825	793
b.	Saint Louis	11,090	385½	66½	27½	14,500 B.	Lorient	1896	1900	1,080,997	15¾ H.N.	3½	3 H.N.	..	3–15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	2 (sub.)	18·0	820 / 1150	631
t.	Suffren	12,527	411¾	70¼	27½	16,500 Nic.	Brest	1899	1903	1,195,564	12–8 H.S.	2¾	5–3 H.S.	..	12 H.S.	6–5 H.S.	4 *12-in.*, 10 *6·4-in.*, 8 *3·9-in.*, 20 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	18·0	1100 / 1820	615
t.	Tréhouart	6671	293¼	58¼	23¼	8500 B.	Lorient	1893	1896	593,100	17¾	4	..	..	14½	..	2 *12-in.*, 8 *3·9-in.*, 4 *1·8-in.*, 4 *1·4-in.*, 8 M.	2	15·76 *t*	300	337
b.	Vergniaud	18,028	476	84	27	22,500 N. tur.	Bordeaux	1910	1911	2,165,200	10–8 K.S	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·67 *t*	960 / 2010	690
b.	Vérité	14,635	438¾	79½	27½	20,433 *t.* B.	Bordeaux	1907	1908	1,661,409	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·26 *t*	905 / 1825	822
a.c.	Victor Hugo	12,351	480½	70¼	27	28,486 *t.* B.	Lorient	1904	1907	1,229,932	6¾–4 H.S.	2	5–3 H.S.	6	8 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-*, 2 *1·4-in.*	2 (sub.)	22·5 *t*	1320 / 2100	728
b.	Voltaire	18,028	476	84	27	22,500 B. tur.	La Seyne	1909	1911	2,169,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	20·66 *t*	960 / 2010	690
a.c.	Waldeck-Rousseau	13,780	515	70¼	27½	36,110 Nic. *t.*	Lorient	1908	1911	1,301,380	6½–3½	2½	5	4¾	6	5½	14 *7·6-in.*, 20 *2·4-in.*, 2 *1-pr.*	2 (sub.)	23·10 *t*	1242 / 2300	738

Pothuau, 5374 tons, gunnery training ship; Latouche-Tréville, 4681 tons, tender to gunnery ship.

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr*	**Alger**	4313	346	45¼	19½	8254 B.	Cherbourg	1889	1891	280,000	3½	..	4 *6·4-in.*, 6 *5·5-in.*, 10 smaller, 10 M.	5	19·61 *t*	860	325
3rd cl. *cr.*	**Cassard**	3890	325½	45	20½	10,143 D'A.	Cherbourg	1896	1898	318,712	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 3 *1·4-in.*, 2 M.	2	19·8 *t*	630	385
2nd cl. *cr.*	**Châteaurenault** shd.	7898	442¾	55¾	24½	24,300 *t.* N.S.	La Seyne	1898	1902	606,656	2½	2 shield	2 *6·4-in.*, 6 *5·5-in.*, 10 *1·8-in.*	2	24·19 *t*	1100 / 2100	625
3rd cl. *cr.*	**Cosmao**	1923	312	30½	14	6000	Bordeaux	1888	1891	133,000	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	4	20·5 *t*	200	190
g. v.	**Décidée**	635	184¾	26¼	12¼	1000 Nic.	Lorient	1899	1900	54,100	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·0	99	99
2nd cl. *cr.*	**D'Entrecasteaux** shd.	7995	383½	58½	25¾	13,500	La Seyne	1896	1898	667,740	4	10–3 H.S.	2 *9·4-in.*, 12 *5·5-in.*, 12 *1·8-in.*	2	19·2 *t*	650	521
3rd cl. *cr.*	**Descartes** shd.	3970	326	42¼	21¾	9000 B.	St. Nazaire	1894	1896	334,725	1½	..	4 *6·4-in.*, 10 *3·9-in.*, 8 *1·8-in.*, 4 *1·4-in.*	2	21·0 *t*	552	386
3rd cl. *cr.*	**D'Estrées** shd.	2121	311¾	39¼	17¾	8500 Nor.	Rochefort	1897	1900	208,200	1½	..	2 *5·5-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 2 *1·4-in.*	..	20·5 *t*	315 / 480	234
3rd cl. *cr.*	**Du Chayla** shd.	3890	325½	45	20½	10,009 D'A.	Cherbourg	1895	1897	315,835	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 3 *1·4-in.*, 2 M.	2	20·2 *t*	624	385
to. g. b.	**Dunois**	889	256	27¾	12¾	7000 N.S.	Cherbourg	1897	1898	123,383	..	..	6 *2·5-in.*, 6 *1·8-in.*	..	23·0	137	128
T.D.S.	**Foudre**	5984	370½	52½	23½	11,900 *t.* D'A.	Bordeaux	1895	1897	407,712	3½	..	8 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	4	19·9 *t*	840	410

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	Friant	3882	308½	43½	20¾	9000 Nic.	Brest	1893	1895	308,750	3	..	6 *6·4-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 6 *1·4-in.*	2	18·19	587	358
2nd cl. *cr.*	Guichen . . shd.	8151	436¼	54¾	24½	24,000 D'A.	St. Nazaire	1897	1899	611,945	2½	2 shield	2 *6·4-in.*, 6 *5·5-in.*, 10 *1·8-in.*	2	23·0	1460	625
2nd cl. *cr.*	Jurien de la Gravière shd.	5595	440	43½	22	17,000 Guyot	Lorient	1899	1901	475,979	3	..	8 *6·4-in.*, 12 *1·8-in.*	2	22·9 *t*	600 900	511
g. v.	Kersaint . . shd.	1223	226	34½	15	2200	Rochefort	1897	1898	107,933	..	..	1 *5·5-in.*, 5 *3·9-in.*, 7 *1·4-in.*	..	15·0	199	110
to. g. b.	La Hire	889	256	27¾	12¾	7000 N.S.	Cherbourg	1898	1899	123,383	..	..	6 *2·5-in.*, 6 *1·8-in.*	..	23·0	137	128
3rd cl. *cr.*	Lavoisier	2285	330¼	34½	17¾	6400 B.	Rochefort	1897	1899	202,024	1½	2 shield	4 *5·5-in.*, 2 *3·9-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 4 M.	2	20·0	226	248
3rd cl. *cr.*	Surcouf	2012	312	30½	14	6000	Cherbourg	1888	1890	131,200	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	4	20·5 *t*	200	190
g. v.	Surprise	617	184¾	24½	12¼	853 *t.*	Havre	1895	1896	50,954	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·4 *t*	73	99
g. v.	Zélée	554	185½	26	10½	1000 Nic.	Rochefort	1899	1900	..	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·0	80	75

Gun vessel Fulton (899 tons); gunboats Comète, Lion. Shallow-draught gunboats Argus and Vigilante, 122 tons; 13 knots.

Mine-layers Pluton and Cerbère, 560 tons, 6000 I.H.P., 20 knots, in course of construction. Converted mining vessels, 966 tons; Casabianca, 974 tons.

Merchant Auxiliary Cruisers.—The Touraine, 8429 register tons, 19·5 knots, Lorraine, 11,869 register tons, 21 knots, Savoie, 11,200 register tons, 22½ knots, and Provence, 13,750 register tons, 22 knots, of the Compagnie Générale Transatlantique, are, under contract, auxiliary cruisers of the Navy in case of war, as well as some other vessels, and the Amazone, Magellan, Tonkin, Touraine, and other 17 and 17½ knot boats of the Messageries Maritimes.

GERMANY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a. c.	Blücher	15,550	499	80¼	..	40,000 *t.*	Kiel	1908	1910	1,250,000	6 K.S.	..	..	..	..	..	12 *8·2-in.*, 8 *5·9-in.*, 16 *3·4-in.*	..	25·3 *t*	900 2300	847
b.	Brandenburg	9874	354¼	65	24½	9640	Stettin (Vulcan)	1891	1893	606,500‡	15¾ *comp.*	2½	..	..	11¾ *comp.*	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 21.	3 (2 sub.)	16·5 *t*	680 800	552
b.	Braunschweig	12,997	398½	73½	24½	16,000 T.S. & C.	Germania	1902	1904	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*, 4 M.	6 (sub.)	18·0	700 1600†	660
b.	Deutschland	13,040	398½	72¾	24½	16,939 T.S. & C.	Germania	1904	1906	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 22 *3·4-in.*, 4 *1·4-in.*, 4 M.	6 (sub.)	18·5 *t*	700 1800†	736
b.	Elsass	12,997	398½	72¾	24½	16,812 W.T.& C.	Danzig (Schichau)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*, 4 M.	6 (sub.)	18·7	800 1600†	660
b.	Friedrich der Grosse	24,119	564¼	95¼	27¼	25,000 (tur.)	Hamburg (Vulcan)	1911	..	..	..	..	..	..	..	..	10 *12-in.*, 14 *5·9-in.*, 12 *3·4-in.*	..	21·0	1000 3600	..
a. c.	Friedrich Karl	8858	393½	65½	24	18,500 Dürr.	Hamburg (Blohm&Voss)	1902	1904	875,000	4 K.S.	2	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 12 *3·4-in.*, 14 *1·4-in.*, 4 M.	4 (3sub.)	20·5 *t*	950 1500†	504
a. c.	Fürst Bismarck	10,570	393½	66½	26	14,000 Dürr.	Kiel	1897	1900	..	7¾ K.S.	3	..	..	7¾ K.S.	..	4 *9·4-in.*, 12 *5·9-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 8 M.	6 (5 sub.)	19·0	1000†	565
a. c.	Gneisenau	11,420	449½	70¾	24½	26,000 T.S.	Bremen (Weser)	1906	1908	..	6–3 K.S.	2	6–4¾	..	6¾	..	8 *8·2-in.*, 6 *5·9-in.*, 20 *3·4-in.*, 14 smaller.	4	23·8 *t*	800† 2000	650
b. cr.	Goeben *	22,600	610¼	96	27	50,000 tur.	Hamburg (Blohm&Voss)	1911	..	..	7½–4 K.S.	..	..	..	8 K.S.	5 K.S.	10 *11-in.*, 12 *5·9-in.*, 12 *3·4-in.*	4	27·0	1000 3100	..
b.	Hannover	13,040	398½	73¾	25¼	22,492 T.S. *t.*	Wilhelmshaven	1905	1907	1,157,500	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 20 *3·4-in.*, 4 *1·4-in.*, 4 M.	6 (sub.)	19·16 *t*	700 1800†	736
b.	Helgoland	22,500	546	93½	26½	28,000	Kiel (Howaldt)	1909	1911	..	10½–4 K.S.	..	..	..	11 K.S.	6 K.S.	12 *12-in.*, 14 *5·9-in.*, 14 *3·4-in.*	6	20·5	900 3000	1107
b.	Hessen	12,997	398½	73¾	24½	16,000 T.S. & C.	Kiel (Germania)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*, 4 M.	6 (sub.)	18·0	800 1600†	660
b. cr.	"K"*	23,000	610	96	27	50,000	Hamburg (Blohm & Voss)	Bldg	..	..	7 K.S.	..	..	..	10 K.S.	..	10 *11-in.*, 12 *5·9-in.*, 12 *3·4-in.*	4	27·0	..	..
b.	Kaiser	24,119	564¼	95¼	27¼	25,000 (tur.)	Kiel	1911	..	..	..	..	..	..	..	..	10 *12-in.*, 14 *5·9-in.*, 12 *3·4-in.*	..	21·0	1000 3600	..

* Particulars doubtful. † Also liquid fuel. ‡ Exclusive of armament.

GERMANY.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
b.	Kaiser Barbarossa					13,000 C.&T.	Danzig	1900	1901 1907	962,500	11¾ H. N. S.	3	..	..	9¾ H. N. S.	6 H.N.S.	4 *9·4-in.*, 14 *5·9-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	4 (sub.)	16·0	650 1050†	700
b.	Kaiser Friedrich III.					13,000 C.&T.	Wilhelms-haven	1896	1899												
b.	Kaiser Wilhelm II.	10,974	377¼	66¾	25½	13,000 C. & T.S.	Wilhelms-haven	1897	1900	962,500	11¾ H. N. S.	3	..	..	9¾ H. N. S.	6 H.N.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·0	650 1050†	700
b.	Kaiser Wilhelm der Grosse					13,000 C. & T.S.	Germania	1899	1901												
b.	Kaiser Karl der Grosse					13,000 C. & T.S.	Hamburg (Blohm & Voss)	1899	1901												
b.	Kaiserin	24,119	564¼	95¼	27¼	25,000 (tur.)	Kiel (Howaldt)	1911	..	..	..	..	..	..	..	..	10 *12-in.*, 14 *5·9-in.*, 12 *3·4-in.*	..	21·0	1000 3600	..
b.	König Albert	24,119	564¼	95¼	27¼	25,000 (tur.)	Danzig (Schichau)	Bldg.	..	..	..	..	..	..	..	..	10 *12-in.*, 14 *5·9-in.*, 12 *3·4-in.*	..	21·0	1000 3600	..
b.	Kurfürst Friedrich Wilhelm (Ersatz)*	..	..	..	..	..	Hamburg (Vulcan)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
b.	Lothringen	12,997	398½	73¾	24½	16,950 W.T.&C.	Schichau (Danzig)	1904	1906	1,157,500	9–4 K. S.	3	6 K. S.	6 K.S.	10–6 K. S.	6 K. S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*, 4 M.	6 (sub.)	18·54 *t*	800 1600†	600
b.	Mecklenburg	11,643	393¾	68¼	24¾	14,000 C.T. & S.	Stettin (Vulcan)	1901	1903	1,061,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (sub.)	18·1 *t*	700 1450†	715
b. cr.	Moltke	22,600	610¼	96	27	86,900 *t* (P. tur.)	Hamburg (Blohm & Voss)	1910	1911	..	7½–4 K.S.	..	..	..	8 K.S.	5 K.S.	10 *11-in.*, 12 *5·9-in.*, 12 *3·4-in.*	4	28·4 *t*	..	..
b.	Nassau	18,200	452	89	26½	20,000	Wilhelms-haven	1908	1909	1,825,000	10–4 K.S.	..	..	..	12 K.S.	..	12 *11-in.*, 12 *5·9-in.*, 16 *3·4-in.*	6	20·7 *t*	950 2700	961
b.	Oldenburg	22,500	546	93½	26½	28,000	Danzig (Schichau)	1910	..												
b.	Ostfriesland	22,500	546	93½	26½	28,000	Wilhelms-haven	1909	1911	..	10½–4 K.S.	..	..	..	11 K.S.	6 K.S.	12 *12-in.*, 14 *5·9-in.*, 14 *3·4-in.*	6	20·5	900 3000	1107
b.	Pommern	13,040	398½	72¾	25¼	20,400 T.S. *t.*	Stettin (Vulcan)	1905	1907	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 20 *3·4-in.*, 4 *1·4-in.*, 4 M.	6 (sub.)	19·21 *t*	700 1800†	736
b.	Posen	18,200	452	89	26½	20,000	Kiel (Germania)	1908	1910	1,825,000	10–4 K.S.	..	..	..	12 K.S.	..	12 *11-in.*, 12 *5·9 in.*, 16 *3·4-in.*	6	20·5	950 2700	961

b.	Preussen	12,997	389½	73¾	24¼	18,374 W.T.& C.	Stettin	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *16·7-in.*, 12 *3·4-in.*, 12 *1·4-in.* & 8 M.	6 (5sub.)	18·6 *t*	800 1600†	660
a. c.	Prinz Adalbert	8858	393½	65½	24	18,500 Dürr.	Kiel	1901	1903	885,000	4 K.S.	1½	3 K.S.	3 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 12 *3·4-in.*, 14 *1·4-in.*, 4 M.	4 (3sub.)	20·3	950 1500†	504
a. c.	Prinz Heinrich	8759	396	64¼	25¼	15,000 Durr.	Kiel	1900	1902	730,000	4 K.S.	2½	4 K.S.	..	6 K.S.	4 K.S.	2 *9·4-in.*, 10 *5·9-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (3sub.)	20·0	950	528
b.	Prinz-Regent Luitpold	24,119	564¼	95¼	27¼	25,000 (tur.)	Kiel (Germania)	1912	..	..	..	..	..	..	..	..	10 *12-in.*, 14 *5·9-in.*, 12 *3·4-in.*	..	21·0	1000 3600	..
b.	Rheinland	18,200	452	89	26½	20,000	Stettin (Vulcan)	1908	1910	1,825,000	10–4 K.S.	..	..	..	12 K.S.	..	12 *11-in.*, 12 *5·9-in.*, 16 *3·4-in.*	6	20·0	950 2700	961
a. c.	Roon	9350	403¼	65½	24	20,625 Dürr.	Kiel	1903	1905	875,000	4–3 K.S.	2¾	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 16 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (sub.)	21·17	750 1800†	50
b.	"S" (Neubau)*	..	..	..	..	..	Wilhelmshaven	..	..	..	..	..	..	..	..	..	..	..	..	..	..
a. c.	Scharnhorst	11,420	449½	70¾	24½	26,000 T.S.	Hamburg (Blohm&Voss)	1906	1908	..	6–3 K.S.	2	6–4¾	..	6¾	..	8 *8·2-in.*, 6 *5·9-in.*, 20 *3·4-in.*, 14 smaller	4	22·5	800† 2000	650
b.	Schlesien	13,040	398½	72¾	25¼	16,939 T.S. & C.	Schichau	1906	1908	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	11–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 20 *3·4-in.*, 4 *1·4*, 4 M.	6 (sub.)	19·2	700 1800†	736
b.	Schleswig-Holstein						Germania												19·5 *t*		
b	Schwaben	11,643	393¾	68¼	24¾	14,000 C.&T.S.	Wilhelmshaven	1901	1903	1,061,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·0	700 1450†	715
b. cr.	Seydlitz*	23,000	610	96	27	50,000	Hamburg (Blohm&Voss)	1912	..	..	7 K.S.	..	..	..	10 K.S.	..	10 *11-in.*, 12 *5·9-in.*, 12 *3·4-in.*	4	27·0	..	..
b.	Thüringen	22,500	546	93½	26½	34,000 *t.* (tur.)	Bremen (Weser)	1909	1911	..	10½–4 K.S.	..	..	..	11 K.S.	6 K.S.	12 *12-in.*, 14 *5·9-in.*, 14 *3·4-in.*	6	21·07 *t*	900 3000	1107
b. cr.	Von der Tann	18,700	561	87	26½	71,500 *t.* (P.tur.)	Hamburg (Blohm&Voss)	1909	1911	1,833,000	6 K.S.	..	..	..	..	6 K.S.	8 *11-in.*, 10 *5·9-in.*, 16 *3·4-in.*	4	27·6 *t*	1000 2800	883
b.	Weissenburg (Ersatz)*	..	..	..	..	..	Bremen (Weser)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
b.	Westfalen	18,200	452	89	26½	26,792 (*t.*)	Bremen (Weser)	1908	1909	1,825,000	10–4	..	..	..	12	..	12 *11-in.*, 12 *5·9-in.*, 16 *3·4-in.*	6	20·2 *t*	950 2700	961
b.	Wettin	11,643	393¾	68¼	24¾	14,000 C.&T.S.	Schichau	1901	1902	1,071,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (sub.)	18·0	700 1450†	715
b.	Wittelsbach						Wilhelmshaven	1900	1902	1,071,250											
b.	Wörth	9874	354¼	65	24½	10,224 (*t.*)	Kiel	1892	1894	595,250‡	15¾	2½	..	..	11¾	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	3 (2sub.)	17·2	680 800	552
a. c.	Yorck	9350	403¼	65½	24	19,183 Dürr.	Hamburg (Blohm&Voss)	1904	1905	875,000	4–3 K.S.	2	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, *10 5·9-in.*, 16 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (sub.)	21·1 *t*	750 1600†	550
b.	Zähringen	11,643	393¾	68¼	24¾	15,000 C.&T.S.	Kiel (Germania)	1901	1902	1,071,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (sub.)	19·0	650 1000†	715

* Particulars doubtful or not known. † Also liquid fuel. ‡ Exclusive of armament.

The programme for 1912 includes a battleship to replace the Brandenburg, and a battle-cruiser nominally to replace the protected cruiser Kaiserin Augusta.

GERMANY.—Cruising Ships.

Class.	NAME.		Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
			tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Amazone**	shd.	2618	328	38½	16	8000 T.S.	Kiel (Germania)	1900	1901	247,000	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	21·5 *t*	560	249
,, ,,	**Arcona**	shd.	2657	328	38½	16	8000 T.S.	Bremen (Weser)	1902	1903	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	21·0	700	249
,, ,,	**Ariadne**	shd.	2618	328	38½	16	8000 T.S.	Bremen (Weser)	1900	1901	247,000	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	22·0	560	249
,, ,,	**Augsburg**		4280	401¾	46	16½	20,000 (tur.)	Kiel	1909	1910	..	2	..	12 *4·1-in.*, 4 *2·1-in.*, 4 M.	2 (sub.)	27·0	400 / 900	363
,, ,,	**Berlin**	shd.	3200	341	43¼	16½	11,000 T.S.	Danzig	1903	1905	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	23·2 *t*	800	286
,, ,,	**Bremen**		3200	341	43¼	16½	10,000 T.S.	Bremen (Weser)	1903	1904	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	23·0	800	286
,, ,,	**Breslau***		4500	..	..	..	..	Stettin (Vulcan)	1911	..	..	..	..	2 *5·9-in.*, 10 *4·1-in.*	2 (sub.)	27·0	..	..
,, ,,	**Danzig**		3200	341	43¼	16½	10,000 T.S.	Danzig	1905	1907	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	23·0	800	286
,, ,,	**Dresden**		3544	364	44¼	15¾	15,000 (tur.)	Hamburg	1907	1908	..	2	..	12 *4·1-in.*, 4 *2·1-in.*, 4 M.	2 (sub.)	27·0	400 / 850	348
g.b.	**Eber**		977	206¾	30¼	10¾	1300 T.S.	Danzig	1903	1904	91,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·0	240	121
3rd cl. *cr.*	**Emden**		3544	364	44¼	15¾	15,000 (tur.)	Danzig	1908	1909	..	2	..	10 *4·1-in.*, 4 *2·1-in.*, 4 M.	2 (sub.)	25·0	400 / 850	320
,, ,,	**Frauenlob**	shd.	2657	328	38½	16	8000 T.S.	Bremen (Weser)	1902	1904	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	21·0	700	249
2nd cl. *cr.*	**Freya**		5569	344½	57	20¾	10,000 Nic.	Danzig	1897	1898	..	4 N.S.	4 N.S.	2 *8·2-in.*, 6 *5·9-in.*, 14 *3·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465
3rd cl. *cr.*	**Gazelle**	shd.	2603	328	38½	16¾	6400 Nic.	Kiel (Germania)	1898	1898	225,000	2	..	10 *4·1-in.*, 14 M.	3 (1 sub.)	18·0	560	210
,, ,,	**Gefion**		3705	344½	42¾	20¾	9000	Danzig (Schichau)	1893	1894	..	1¼	..	10 *4·1-in.*, 6 *2·1-in.*, 4 M.	2	19·0	780	302
,, ,,	**Geier**	shd.	1597	249¼	34¾	15½	2960	Wilhelmshaven	1894	1896	..	3	..	8 *4·1-in.*, 7 M.	..	16·2 *t*	300	165
,, ,,	**Geier (Ersatz)***		5000	..	..	..	..	Kiel (Howaldt)	Bldg.	..	..	..	..	2 *8·2-in.*	..	27·0	..	..

3rd cl. *cr.*	**Hamburg**	shd.	3200	341	43¼	16½	11,500 T.S.	Stettin (Vulcan)	1903	1904	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	23·28 *t*	800	249
2nd cl. *cr.*	**Hansa**	shd.	5791	345½	57¾	21¾	10,000 B.	Stettin (Vulcan)	1898	1899	..	4 N.S.	4 N.S.	2 *8·2-in.*, 8 *5·9-in.*, 10 *3·4-in.*, 4 M.	3 (sub.)	19·5	825	465
,, ,,	**Hertha**		5569	344½	57	21¾	10,000 B.	Stettin (Vulcan)	1897	1898	..	4 N.S.	4	2 *8·2-in.*, 6 *5·9-in.*, 14 *3·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465
g. b.	**Iltis**	shd.	881	203½	29¾	10¾	1300 T.	Danzig (Schichau)	1898	1898	100,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	165	121
3rd cl. *cr.*	**Irene**†	shd.	4224	308	46	21	8000	Stettin (Vulcan)	1887	1888	220,000	3	..	4 *5·9-in.*, 8 *4·1-in.*, 6 *2·1-in.*, 1 l., 8 M.	3	19·8 *t*	540	365
g. b.	**Jaguar**	shd.	900	203½	29¾	10¾	1300 T.	Danzig (Schichau)	1898	1899	90,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	165	121
2nd cl. *cr.*	**Kaiserin Augusta**	shd.	5956	387	52½	23	14,000	Kiel (Germania)	1892	1896	..	3½	..	12 *5·9-in.*, 8 *3·4-in.*, 4 M.	3 (1 sub.)	21·0	850	436
3rd cl. *cr.*	**Kolberg**		4232	388¼	46	16½	20,000 (tur.)	Danzig (Schichau)	1908	1910	..	2	..	12 *4·1-in.*, 4 *2·1-in.*, 4 M.	2 (sub.)	25·5	400 900	363
,, ,,	**Köln**		4280	401¾	46	16½	20,000 (tur.)	Kiel (Germania)	1909	1910	..	2	..	12 *4·1-in.*, 4 *2·1-in.*, 4 M.	4 (sub.)	27·2 *t*	400 900	363
,, ,,	**Königsberg**		3350	354¼	43½	15¾	13,200 T.S.	Kiel	1906	1907	..	2	..	10 *4·1-in.*, 8 *2·1-in.*, 4 M.	2 (sub.)	23·5	400 850	295
,, ,,	**Leipzig**		3200	341	43¼	16½	11,000	Bremen (Weser)	1905	1906	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	23·0	800	286
,, ,,	**Lübeck**		3200	341	43¼	16½	14,000 T.S. tur.	Stettin (Vulcan)	1904	1906	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	23·0	800	286
g. b.	**Luchs**		962	206¾	30¼	10¾	1300 T.S.	Danzig	1899	1900	91,000	2	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
,, ,,	**Magdeburg***		4500	..	..	..	..	Bremen (Weser)	1911	..	..	..	..	2 *5·9-in.*, 10 *4·1-in.*	2 (sub.)	27·0	..	..
3rd cl. *cr.*	**Mainz**		4232	388¼	46	16½	20,000 (tur.)	Stettin (Vulcan)	1909	1910	..	2	..	12 *4·1-in.*, 4 *2·1-in.*, 4 M.	2 (sub.)	28·0 *t*	400 900	363
,, ,,	**Medusa**	shd.	2618	328	38½	16	8000 T.S.	Bremen (Weser)	1900	1901	247,000	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	22·0	560	249
,, ,,	**München**	shd.	3200	341	43¼	16½	11,000 T.S.	Bremen (Weser)	1904	1905	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	23·4 *t*	800	286
,, ,,	**Niobe**	shd.	2603	328	38½	15	8000 T.S.	Bremen (Weser)	1899	1901	217,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	20·0	560	250
,, ,,	**Nymphe**	shd.	2618	328	38½	15	8000 T.S.	Kiel (Germania)	1899	1901	217,500							
,, ,,	**Nürnberg**		3396	354¼	43½	15¾	13,200 T.S.	Kiel	1906	1908	..	2	..	10 *4·1-in.*, 8 *2·1-in.*, 4 M.	2 (sub.)	23·5	400 850	295
g. b.	**Panther**		962	206¾	30¼	10¾	1300 T.S.	Danzig	1901	1902	91,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
3rd cl. *cr.*	**Prinzess Wilhelm**†		4224	339½	46	21	8000	Kiel (Germania)	1887	1888	220,000	3	..	4 *5·9-in.*, 8 *4·1-in.*, 6 *2·1-in.*, 4 M.	3 (1 sub.)	18·7 *t*	540	365

* Programmes 1909, 1910. Particulars uncertain.

† The programme for 1912 includes two cruisers to replace the Irene and Prinzess Wilhelm.

GERMANY.—Cruising Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			kts.	tons.	
3rd cl. *cr.*	Seeadler	1614	246	33½	15	2800	Hamburg	1892	1892	..	3	..	8 *4·1-in.*, 7 M.	2	16·0	300	165
,, ,,	Seeadler (Ersatz)*	5000	..	..	..	..	Kiel (Germania)	Bldg.	..	..	..	..	2 *8·2-in.*	..	27·0	..	..
,, ,,	Stettin	3396	354¼	43½	15¾	13,200 T.S. tur.	Stettin (Vulcan)	1907	1907	..	2	..	10 *4·1-in.*, 8 *2·1-in.*, 4 M.	2 (sub.)	23·5	400 / 850	295
,, ,,	Strassburg*	4500	..	..	..	..	Wilhelmshaven	1911	..	..	..	..	2 *5·9-in.*, 10 *4·1-in.*	2 (sub.)	27·0	..	..
,, ,,	Stralsund*	4500	..	..	..	..	Bremen (Weser)	1911	..	..	..	..	2 *5·9-in.*, 10 *4·1-in.*	2 (sub.)	27·0	..	..
,, ,,	Stuttgart	3396	354¼	43½	15¾	13,200 T.S. tur.	Kiel	1906	1908	..	2	..	10 *4·1-in.*, 8 *2·1-in.*, 4 M.	2 (sub.)	23·3 *t*	400 / 850	295
,, ,,	Thetis . . shd.	2618	344½	38½	16	8000 T.S.	Danzig	1900	1901	247,000	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	21·8 *t*	560	249
g. b.	Tiger	962	203½	29¾	10	1300 T.S.	Danzig	1899	1900	..	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
3rd cl. *cr.*	Undine . . shd.	2657	328	38½	16	8000 T.S.	Kiel (Howaldt)	1902	1904	254,500	2	..	10 *4·1-in.*, 14 M.	2 (sub.)	21·0	700	249
2nd cl. *cr.*	Victoria Luise	5569	344½	57	21¾	10,000 Dürr.	Bremen (Weser)	1897	1898	..	4 H.S.	4 H.S.	2 *8·2-in.*, 6 *5·9-in.*, 14 *3·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465
,, ,,	Vineta . . shd.	5791	345½	57¾	21¾	10,000 Dürr.	Danzig	1897	1899	..	4 H.S.	4 H.S.	2 *8·2-in.*, 8 *5·9-in.*, 10 *3·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465

* Programmes 1909, 1910, 1911. Particulars uncertain. Geier (Ersatz) and Seeadler (Ersatz) may have side armour.

The Imperial Yacht Hohenzollern, 4187 tons, 9460 I.H.P., 22 knots, carries 3 4·1-in., 12 1·9-in. Q.F. and 4 M. River gunboats for China, the Tsingtau, Vaterland Vorwärtz (168 tons), Otter (270 tons). The mining vessels Nautilus and Albatross (2000 tons), Pelikan (2215 tons). Gunnery tender Drache, 765 tons, 15 knots. Submarine salvage vessel Vulkan.

Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Register Tonnage.	Length.		Beam.		Draught of Water.		Indicated H.P.	Ocean Speed.	When Built.	Armament of each Ship.
		tons.	ft.	in.	ft.	in.	ft.	in.		knots.		
North German Lloyd	Kronprinzessin Caecilie .	19,500	678	0	72	0	29	0	45,000	23½	1906	The armament is of 6-in. and smaller quick-firers.
	Kaiser Wilhelm II . .	19,500	678	0	72	0	29	0	45,000	23½	1901	
	Kronprinz Wilhelm .	14,800	640	0	66	0	26	3	30,000	23	1901	
	Kaiser Wilhelm der Grosse	14,349	625	0	66	0	27	0	30,000	23	1897	
	George Washington . .	26,000	..		..		..		20,000	19	1908	

Many other vessels of less than 18 knots speed are in the list, including the Prinz Friedrich Wilhelm (16,900 register tons), and the Berlin (17,000 register tons), 17 knots.

GREECE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Giorgios Averoff	9956	429¾	68¾	24¾	20,000 B	Leghorn (Orlando)	1910	1911	1,100,000	8–3½ K.S.	1¾	7	7	7–6	..	4 *9·2-in.*, 8 *7·5-in.*, 16 *3in.*, 8 *1·8-in.*	3 (sub.)	24·0	700 1600	..
b.	Hydra	4808	334½	51¾	23¼	7000	St. Nazaire La Seyne	1889	1891 1900	..	11¾–4	2½	3	..	13½	..					
,,	Psara	4808	334½	51¾	23¼	7000	Havre La Seyne	1890	1892 1897	..	11¾–4	2½	3	..	13½	..	3 *10·6-in.* Canet, 5 *5·9-in.*, 1 *3·9-in.*, 8 *2·5-in.*, 4 *1·8-in.*, 12 *1·4-in.*	3	17·0	600	400
,,	Spetsai	4808	334½	51¾	23¼	7000	Havre La Seyne	1889	1891 1900	..	11¾–4	2½	3	..	13½	..					

GREECE.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
g.v.	Acheloos	420	130	24½	11½	400	Blackwall	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M..	..	10·0	50	..
,,	Alphios	420	130	24½	11½	400	Blackwall	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M..	..	10·0	50	..
,,	Eurotas	420	130	24½	11½	400	Dumbarton	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M..	..	10·0	50	..
corv.	Sfaktirea	1000	216½	29¼	18	2400	England	1885	1886	..	..	..	2 *3·9-in.* (K.), 2 M..	..	14·5	100	..

Torpedc depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 14 knots speed. Mine-layers Aigialla, Monemvassia, Nauplia. An armoured cruiser is to be built.

ITALY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	ins.	ins.	ins.	ins.	ins.			knots.	tons.	
a.c.	Amalfi . . .	9956	429¾	68¾	24¾	20,800 B.	Genoa (Odero)	1908	1909	880,000	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	..	4 *10-in.*, 8 *7·5-in.*, 16 *3-in.*, 2 M.	3 (sub.)	23·6 t	700 1500	687
b.	Ammiraglio di St. Bon	9645	344½	69¼	24¾	13,500	Venice . .	1897	1901	..	9¾–4 H.S.	3–1½	6 H.S.	6 H.S.	9¾ H.S.	6 H.S.	4 *10-in.*, 8 *6-in.*, 8 *4·7-in.*, 2 *2·9-in.*, 8 *2·2-in.*, 12 *1·4-in.*, 2 M.	4	18·3 t	600	548
b.	Benedetto Brin . .	13,214	426½	78¼	27¼	20,400 B.	Castellammare	1901	1905	..	6–2 H.S.	3	6 H.S.	8 H.S.	10 H.S.	6 H.S.	4 *12-in.*, 4 *8-in.*, 12 *6-in.*, 16 *3-in.*, 8 *1·8-in.*, 4 M.	4 (sub.)	19·5 t	1000 2000	811
a.c.	Carlo Alberto . .	6396	325	59	23	13,220 t	Spezia . .	1896	1898	..	6–4½ H.S.	1½	6 H.S.	..	6 H.S.	4½ shields	12 *6-in.*, 6 *4·7-in.*, 2 *2·9-in.*, 10 *2·2-in.*, 10 *1·4-in.*, 2 M.	4	19·2 t	1000	500
b.	Conte di Cavour .	21,500	557	92	28	24,000 Parsons Bl.	Spezia . .	1911	..	..	9½–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 20 *4·7-in.*, 14 *12-pr.*	3 (sub.)	22	1000	999
b.	Dante Alighieri .	18,300	505	85	27¼	26,000 Parsons Bl.	Castellammare	1910	1912	..	9½–4½ K.S.	1½	6 K.S.	..	10 K.S.	..	12 *12-in.*, 20 *5·5-in.*, 13 *12-pr.*	3 (sub.)	23	1000 2500	900
b.	Doria (Andrea)* . Duilio* . .	21,000	570	91	29	38,000 P. tur.	Spezia . . Castellammare	Bldg. Bldg.	..	..	10½–6 K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 20 *5·9-in.*, 14 *12-pr.*	3 (sub.)	23	1000	..
b.	Emanuele Filiberto .	9645	344½	69¼	24¾	13,500	Castellammare	1897	1901	..	9¾–4 H.S.	3–1	6 H.S.	6 H.S.	9¾ H.S.	6 H.S.	4 *10-in.*, 8 *6-in.*, 8 *4·7-in.*, 2 *2·9-in.*, 8 *2·2-in.*, 12 *1·4-in.*, 2 M.	4	18·3 t	600	536
a.c. a.c.	Francesco Ferruccio Giuseppe Garibaldi	7294	344	59¾	23¼	13,500 Nic. 14,713 t Nic.	Venice . . Sestri-Ponente (Ansaldo)	1902 1899	1904 1901	..	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	1 *10-in.*, 2 *8-in.*, 14 *6-in.*, 10 *2·9-in.*, 6 *1·8-in.*, 2 M.	4 (sub.)	20·0	655 1200	540
b. b.	Giulio Cesare . Leonardo da Vinci	21,500	557	92	28	24,000 P. B.&W. P. Bl.	Sestri-Ponente (Ansaldo) Genoa (Odero)	1911 1911	..	..	9½–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 20 *4·7-in.*, 11 *12-pr.*	3 (sub.)	22	1000	999
a.c.	Marco Polo . .	4511	327	48¼	19½	10,543 t	Castellammare	1892	1894	344,400	4	1	4	4	4	..	6 *5·9-in.*, 10 *4·7-in.*, 2 *2·9-in.*, 9 *2·2-in.*, 4 *1·4-in.*, 2 M.	4 (1sub.)	19·0 t	600	394

* Particulars uncertain; may carry 13·5-in. guns.

ITALY.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
b.	Napoli Regina Elena	12,425	435½	73½	27¼	20,000 B.&W. 20,000 B.	Castellammare Spezia	1905 1904	1909 1907	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	2 (sub.)	22·0	1000 / 2000	711
a.c.	Pisa	9956	429¾	68¾	24¾	18,000 B.	Leghorn (Orlando)	1907	1909	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	..	4 *10-in.*, 8 *7·5-in.*, 16 *3-in.*, 2 M.	3 (sub.)	23·0	700 / 1600	687
b.	Regina Margherita	13,214	426½	78¼	27¼	20,664 Nic.	Spezia	1901	1904	..	6 H.S.	3	6 H.S.	8 H.S.	8 H.S.	6 H.S.	4 *12-in.*, 4 *8-in.*, 12 *6-in.*, 16 *3-in.*, 8 *1·8-in.*, 4 M.	4 (sub.)	20·2 *t*	1000 / 2000	811
,,	Re Umberto	13,673	400	76¾	28½	19,500	Castellammare	1888	1893	1,058,500	4	3	4	2¾	18	..	4 *67-ton* (A.), 8 *6-in.*, 16 *4·7-in.*, 2 *9-in.*, 15 *2·2-in.*, 14 *1·4-in.*, 2 M.	5	19·0	1200	785
,,	Roma	12,425	435½	73½	27¼	20,000 B. & W.	Spezia	1907	1909	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	2	22·0	1000 / 2000	711
a.c.	San Giorgio San Marco	9832	429¾	68¾	24¾	18000 Bl. 18000 tur.	Castellammare	1908	1910	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	7 K.S.	4 *10-in.*, 8 *7·5-in.*, 16 *3-in.*, 8 *1·8-in.*	3 (sub.)	22·5	700 / 1600	643
b.	Sardegna	13,640	411	76¾	28½	19,650 *t*	Spezia	1890	1895	1,057,440	4	3	4	2¾	14¼ *comp.*	..	4 *67-ton* (A.), 8 *5·9-in.*, 16 *4·7-in.*, 2 *2·9-in.*, 20 *2·2-in.*, 10 *1·4-in.*, 2 M.	5	20·1 *t*	1200	785
,,	Sicilia	13,087	400	76¾	28½	19,500	Venice	1891	1895	1,050,000	4	3	4	2¾	18 *comp.*	..	4 *67-ton* (A.), 8 *5·9-in.*, 16 *4·7-in.*, 2 *2·9-in.*, 20 *2·2-in.*, 10 *1·4-in.*, 2 M.	5	19·2 *t*	1200	785
a.c.	Varese	7294	344	59¾	23⅓	13,500 B.	Leghorn (Orlando)	1899	1901	..	6–4½ H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	1 *10-in.*, 2 *8-in.*, 14 *6-in.*, 10 *2·9-in.*, 6 *1·8-in.*, 2 M.	4	20·0	650 / 1200	500
a.c.	Vettor Pisani	6396	325	59	23	13,000	Castellammare	1895	1897	..	6 H.S.	1½	6 H.S.	..	6 H.S.	4½ shields	12 *6-in.*, 6 *4·7-in.*, 2 *2·9-in.*, 10 *2·2-in.*, 10 *1·4-in.*, 2 M.	4	20·0	600	504
b.	Vittorio Emanuele III	12,425	435½	73½	27¼	20,000 B.	Castellammare	1904	1907	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	2 (sub.)	22·0	1000 / 2000	711

ITALY.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
to.cr.	**Agordat**	1292	287½	30½	11	8000	Castellammare	1899	1900	..	1	..	4 *4·7-in.*, 8 *2·2-in.*, 2 *1·4-in.*	2	22·0	160	158
to.g.b.	**Aretusa**	833	230	26¾	11¾	4420	Leghorn (Orlando)	1891	1892	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	20·7 *t*	120	111
3rd cl. *cr.*	**Calabria**	2428	249¼	42	16¾	4094 *t*	Spezia	1894	1897	183,120	2	..	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	16·4 *t*	500	257
to.cr.	**Coatit**	1292	287½	30½	11	8160	Castellammare	1899	1902	..	1	..	4 *4·7-in.*, 8 *2·2-in.*, 2 *1·4-in.*	2	21·1 *t*	160	158
3rd cl. *cr.*	**Elba*** shd.	2689	272½	40¾	16½	7471 *t*	Castellammare	1893	1895	200,000	2	4½	2 *5·9-in.*, 8 *4·7-in.*, 8 *2·2-in.*, 2 *1·4-in.*, 1 M.	2	17·9 *t*	500	272
,, ,,	**Etruria**	2245	262½	39½	16½	7585 *t*	Leghorn (Orlando)	1891	1893	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 10 *1·4-in.*, 2 M.	2	19·8¼ *t*	400	257
g.r.	**Governolo**	1235	185	33¾	13¾	1100	Venice	1894	1896	58,440	..	..	4 *4·7-in.*, 4 *2·2-in.*, 2 *1·4-in.*, 2 M.	..	13·0	200	131
to.g.b.	**Iride**	931	229½	27	10¼	4242	Castellammare	1891	1892	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	19·6 *t*	120	111
3rd cl. *cr.*	**Liguria***	2245	262½	39¼	16¾	7677 *t*	Sestri (Ansaldo)	1893	1894	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 10 *1·4-in.*, 2 M.	2	19·6 *t*	430	257

* Ballooning service.

ITALY.—Cruising Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
Scout	Marsala	3250	460½	42¾	13¼	22,500 P. tur. Bl.	Castellammare	1912	..	..	1½	..	6 *4·7-in.* and 6 *12-pr.*	2	29·0	450	197
to.g.b.	Minerva	833	246	27½	11¾	4800 W.T.	Sestri (Ansaldo)	1892	1893	72,720	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	5	21·0	120	111
to.g.b.	Montebello (miner)	801	230	25½	11¾	2776	Spezia	1888	1899	74,120	..	1	6 *2·2-in.*, 2 *1·4-in.*	4	18·0	100	111
Scout	Nino Bixio	3250	460¼	42¾	13¼	22,500 Bl. Cur. t.	Castellammare	1911	..	..	1½	..	6 *4·7-in.* and 6 *12-pr.*	2	29·0	450	197
to.g.b.	Partenope (miner)	821	246	27½	11¾	4200	Castellammare	1890	1890	71,000	..	1	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	4	19·0	100	111
3rd cl. *cr.*	Puglia	2498	269	41	16¾	7000	Taranto	1898	1900	200,000	4½	1	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	20·0	650	257
Scout	Quarto	3250	432	42¾	13¼	22,500 P. tur. Bl.	Venice	1911	..	..	1½	..	6 *4·7-in.* and 6 *12-pr.*	2	29·0	450	197

Etna (3474 tons), converted into a training ship. Goito and Tripoli, mining vessels. *Subsidised auxiliary cruisers and despatch vessels.*—Nord America (La Veloce S.S. Co.), Regina Margherita, Galileo Galilei, Marco Polo, Umberto I., Cristoforo Colombo, Elettrico, Candia, Malta, Perseo, Orione, and some others (Navigazione Generale), Messina and Siracusa (19¾ knots), Catania and Palermo (23 knots), Principessa Mafalda (18½ knots) Italian Lloyd. The armament of these vessels is 2 2·2-in. Q.F., and 4 1·4-in. M. The coal and liquid fuel transports Bronte and Sterope (9490 tons) are completed. Provision is made for a docking vessel for submarines, and a river gunboat. Lagoon gunboats Brondolo and Marghera. A surveying vessel, Ammiraglio Magnaghi, 1800 tons, 14 knots, to be built. Small vessels, Capitano Verri (*ex*-Thetis) and Bengazi (*ex*-Derna) captured from the Turks. Sebastiano Caboto, small gunboat for the South American station, in hand; 800 tons, 13 knots.

JAPAN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Adzuma	9436	431½	59¼	24¾	17,000 B.	St. Nazaire	1899	1901	..	7–3½ H. S.	3	5 H.S.	..	6 H. S.	6 H.S.	4 *8-in.*, 12 *6-in.*, 12 *3-in.*, 8 *1·8-in.*	5 (4 sub.	20·0	600 1275	482
b.	Aki	19,800	482	83½	27½	18,000 My. tur.	Kure	1907	1911	..	9–5 K. S.	2–3	8	..	9	6	4 *12-in.*, 12 *10-in.*, 8 *6-in.*, 8 *12-pr.*, 4 M.	5 (4 sub.)	20·5	..	940
,,	Asahi	15,800	400¾	75¼	27¼	15,000 B.	Clydebank	1899	1900	..	9–4 H. S.	4–2½	6 H.S.	12 H.S.	14 H. S.	6 H.S.	4 *12-in.*, 14 *6-in.*, 20 *12-pr.*, 8 *3-pr.*, 4 *2½-pr.*	4 (sub.)	18	700 1549	750
a.c.	Asama	9700	408	67	24½	19,000 t	Elswick	1898	1899	..	7–3½ H. S.	2	5 H.S.	..	6	6 H.S.	4 *8-in.*, 14 *6-in.* (A.), 12 *12-pr.*, 8 *2½-pr.*	5 (4 sub.)	22·1 t	600 1409	482
,,	Aso (*ex* Bayan)	7726	443	55¾	22	17,400 My. t.	La Seyne	1900	1902	..	8–3 K.S.	2	3 K.S.	..	7 K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 32 *2·9-in.*, 20 *3-pr.*, 6 *1-pr.* 3 l., and M.	2 (sub.)	22 t	750 11,000	570
a.c.	Chiyoda	2450	308	42½	14	5700 B.	Clydebank	1889	1890	..	4½	1–2	..	..	..	..	10 *4·7-in.*, 14 *3-pr.*, 3 M.	3	17·5	420	300
b.	Fuji	12,320	374	73	26½	14,000	Thames	1896	1897	..	18–6 H. S.	4–2½	4 H.S.	..	14 H. S.	6 H.S.	4 *12-in.*, 10 *6-in.*, 20 *3-pr.*, 4 *4½-pr.*	5 (4 sub.)	19·2 t	1100	600
b.	Fuso *	30,000	..	..	..	..	Kure	Bldg.	..	..	..	..	..	..	..	..	*15-in.* guns	..	..	..	..
b.c.	Haruna	27,500	..	..	..	64,000 P. tur. C. tur.	Kobe (Kawasaki)	Bldg.	..	..	10 K.S.	..	..	..	..	..	8 *13·5-in.*, 16 *6-in.*, 5 M.	5 (sub.)	27	1000 3500	..
b.c.	Hiyei						Yokosuka	Bldg.	..												
,,	Hizen (*ex* Retvizan)	12,700	374	72¼	25	16,000 My.	Philadelphia	1900	1902	..	9–4 K.S.	4	6–2 K.S.	9 K.S.	10 K.S.	5 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-pr.*, 6 *1-pr.*	2	18·0	800 2000	778
a.c.	Ibuki	14,620	450½	75½	26¼	27,000 My. tur.	Kure	1907	1909	..	7–4 K.S.	2	5 K.S.	..	9 K.S.	..	4 *12-in.*, 8 *8-in.*, 14 *4·7-in.*, 3 *1·8-in.*, 2 l., 4 M.	3 (sub.)	22	2000	820
b	Idzumo	9750	400	68½	24½	17,300 B. t.	Elswick	1899	1900	..	7–3½ H.N.S.	2½	5 H.N.S.	..	6 H. N.S.	6 H. N.S.	4 *8-in.*, 14 *6-in.*, 12 *12-pr.*, 8 *2½-pr.*	4 (sub.)	22·0	600 1412	672
,,	Iwate							1900	1901										21·7 t		
a.c.	Ikoma	13,750	440	75	26	20,500 My.	Kure	1906	1908	..	7–5 K.S.	..	..	..	7 K.S.	..	4 *12-in.*, 12 *6-in.*, 12 *4·7-in.*, 2 *1·8-in.*, 2 l., 4 M.	3 (sub.)	21·0	600 2000	817

* Particulars uncertain.

JAPAN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Iwami (*ex* Orel)	13,516	$367\frac{1}{2}$	76	26	16,000 My.	St. Petersburg (Galerny)	1902	1904	..	9–4 K.S.	$2\frac{1}{2}$–$1\frac{1}{2}$	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 6 *8-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	3 (2 sub.)	18·0	800 2000	740
,,	Kashima	16,400	425	$78\frac{1}{6}$	27	17,280 Nic.	Elswick	1905	1906	..	9–4 K.S.	3–$2\frac{1}{2}$	6	6	9 K.S	6 K.S.	4 *12-in.*, 4 *10-in.*, 12 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 6 M., 2 l.	5 (sub.)	19·2 *t*	750 2150	980
a.c.	Kasuga	7630	344	$59\frac{3}{4}$	$24\frac{1}{4}$	13,500	Sestri Ponente	1902	1904	760,000	6 H. N.S.	$1\frac{1}{2}$	6 H. N.S.	6 H. N.S.	6 H. N.S.	6 H. N.S.	1 *10-in.*, 2 *8-in.*, 14 *6-in.*, 10 *3-in.*, 6 *1·8 in.*, 2 M.	4	20·0	600 1150	500
b.	Katori	15,950	420	78	27	18,500 *t*, Nic.	Barrow	1905	1906	..	9–5 K.S.	3–2	6	6	10 K.S.	6 K.S.	4 *12-in.*, 4 *10-in.*, 12 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 6 M., 2 l.	5 (sub.)	19·5 *t*	750 1800	980
,,	Kawachi	20,800	480	84	28	26,500 tur.	Kure	1910	..	..	12–$9\frac{1}{2}$ K.S.	$2\frac{1}{2}$	9 K.S.	..	12 K.S.	..	12 *12-in.*, 10 *6-in.*, 12 *4·7-in.*	5 (sub.)	20·5	900 2500	960
b.c.	Kirishima	27,500	..	..	..	64,000	Nagasaki (Mitsubishi)	Bldg.	..	..	10 K.S.	..	..	..	..	..	8 *13·5-in.*, 16 *6-in.*, 5 M.	5 (sub.)	27·0	1000 3500	..
b.c.	Kongo	27,500	..	..	..	64,000 P. tur.	Barrow	Bldg.	..	2,500,000	10 K.S.	..	..	..	..	..	8 *13·5-in.*, 16 *6-in.*, 5 M.	5 (sub.)	27·0	1000 3500	..
a.c.	Kurama	14,620	$450\frac{1}{2}$	$75\frac{1}{2}$	$26\frac{1}{4}$	27,000 My.	Yokosuka	1907	1911	..	7–4 K. S.	2	5 K.S.	..	9 K. S.	..	4 *12-in.*, 8 *8-in.*, 14 *4·7-in.*, 3 *1·8-in.*, 2 l., 4 M.	3 (sub.)	22·0	2000	820
b.	Mikasa	15,200	400	76	$27\frac{1}{4}$	16,431 B.	Barrow	1900	1902	..	9–4 H.N.S.	3	6 H. N.S.	12 H. N.S.	14 H. N.S.	6 H. N.S.	4 *12-in.*, 4 *10-in.*, 10 *6-in.*, 20 *12-pr.*, 12 small, 8 M.	4 (sub.)	18·5 *t*	700 1520	935
c.d.	Minoshima (*ex* Seniavine)	4792	265	$52\frac{1}{2}$	17	5000 My.	St. Petersburg	1894	1895	410,000	10	3	..	..	7–8	..	4 *10-in.*, 4 *4·7-in.*, 6 *1·8-in.*, 8 M.	4	16·0	400	318

a.c.	**Nisshin** . .	7630	344	59¾	24¼	13,500	Sestri Ponente	1903	1904	760,000	6 H. N.S.	1½	6 H. N.S.	6 H. N.S.	6 H. N.S.	6 H. N.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 6 *1·8-in.*, 2 M.	4	20·0	600 1150	500
c.d.	**Okinoshima** (*ex* Apraxine)	4126	277½	52½	17½	5757 *t.*	St.Petersburg (New Admiralty)	1896	1898	..	10 H. S.	3	..	..	7¾ K. S.	..	3 *10-in.*, 4 *4·7-in.*, 10 *1·8-in.*, 12 *1·4-in.*	4	15·0 *t*	215	318
b.	**Sagami** (*ex* Peresviet)	12,674	401¼	71¾	26	14,500 My.	St.Petersburg (Baltic)	1898	1901	..	9–7 H. S.	2¾	6 H. S.	9 H. S.	9 H. S.	6 H. S.	4 *12-in.*, 10 *6-in.*, 16 *12-pr.*, 10 *3-pr.*, 17 *1-pr.*	2 (sub.)	18·0	800 2056	732
,,	**Satsuma** . .	19,350	482	83½	27½	18,000 My.	Yokosuka .	1906	1910	..	9–5 K. S.	2–3	8	..	9	6	4 *12-in.*, 12 *10-in.*, 12 *4·7-in.*, 4 *12-pr.*, 4 M.	5 (sub.)	20·5	1000 2500	940
,,	**Settsu** . . .	20,800	480	84	28	26,500 tur.	Yokosuka .	1911	..	..	12–9½ K.S.	2½	9 K.S.	..	12 K.S.	..	12 *12-in.*, 10 *6-in.*, 12 *4·7-in.*	5 (sub.)	20·5	900 2500	960
,,	**Shikishima** . .	14,850	400	75¼	26½	16,355 B.	Thames .	1898	1899	..	9–4 H.N.S.	4–2½	6 H. N.S.	12 H. N.S.	14	6 H. N.S.	4 *12-in.*, 14 *6-in.*, 20 *12-pr.*, 8 *3-pr.*, 4 *2½-pr.*, 8 M.	5 (4 sub.)	18·3	700 1722	741
,,	**Suo** (*ex* Pobieda) .	12,674	401¼	71½	26	14,500 My.	St.Petersburg (Baltic)	1900	1901	..	9½–4 H. S.	2¾	9 H. S.	9 H. S.	9 H. S.	6 H. S.	4 *12-in.*, 10 *6-in.*, 16 *12-pr.*, 10 *3-pr.*, 17 *1-pr.*, 2 l.	2 (sub.)	18·0	800 2056	732
..	**Tango** (*ex* Poltava)	10,960	367½	69	26	11,255 My.	St.Petersburg	1894	1898	1,098,000	15¾	3½	4	9	10 H. S.	6	4 *12-in.*, 12 *6-in.*, 14 small	..	16·0	900	700
a.c.	**Tokiwa** . .	9700	408	67	21½	20,556 *t.*	Elswick .	1898	1899	..	7–3½ H. S.	2	5 H.S.	..	6 H. S.	6 H.S.	4 *8-in.*, 14 *6-in.* (A.), 12 *12-pr.*, 8 *2½-pr.*	5 (4 sub.)	23·0	600 1409	500
,,	**Tsukuba** . .	13,750	440	75	26	20,500 My.	Kure .	1905	1907	..	7–5 K. S.	..	..	..	7 K. S.	..	4 *12-in.*, 12 *6-in.*, 12 *4·7-in.*, 2 *1·8 in.*, 2 l., 4 M.	3 (sub.)	21·0	600 2000	817
,,	**Yakumo** . .	9850	407¾	64¼	23¾	16,000 B.	Stettin .	1899	1901	..	7–3½ H. S.	2½	5 H.S.	..	6 H. S.	6 H.S.	4 *8-in.* (A.), 12 *6-in.*, 12 *12-pr.* (A.), 8 *2½-pr.*	5 (4 sub.)	20·0	600 1100	500

Iki (*ex* Nicolai I.), 9672 tons (1888), 2 *12-in.*, 4 *9-in.*, 8 *6-in.*, gunnery ship.

JAPAN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	**Akashi**	2657	$295\frac{1}{4}$	$41\frac{3}{4}$	$16\frac{1}{2}$	8500	Yokosuka	1897	1898	327,000	2	$4\frac{1}{2}$ shield	2 *6-in.* (A.), 6 *4·7-in.*, 10 *3-pr.*, 2 *$2\frac{1}{2}$-pr.*, 4 M.	2	20·0	200 / 544	300
„	**Akitsushima**	3150	302	$42\frac{1}{2}$	$18\frac{1}{4}$	8400	Yokosuka	1892	1893	..	3	..	4 *6-in.*, 6 *4·7-in.*, 10 *3-pr.*	4	19·0	..	330
t.g.b.	**Chihaya**	1250	273	$31\frac{1}{2}$	10	5500 Nor.	Yokosuka	1900	1901	..	..	..	2 *4·7-in.*, 4 *12-pr.*	5	21·0	123 / 344	170
cr.	**Chitose**	4760	395	49	18	15,500	San Francisco	1898	1899	205,200	$4\frac{1}{2}$	$4\frac{1}{2}$ shield	2 *8-in.*, 10 *4·7-in.*, 12 *12-pr.*, 6 *$2\frac{1}{2}$-pr.*	4	22·5	350 / 1000	405
„	**Hashidate**	4277	295	$50\frac{3}{4}$	$21\frac{1}{4}$	5400 My.	Yokosuka	1891	1893	..	2	12	1 *12·5-in.* (Canet), 11 *4·7-in.*, 5 *6-pr.*, 11 *3-pr.*, 6 M.	4	17·0	400	350
„	**Hirado**	4800	475	$46\frac{1}{2}$	$16\frac{3}{4}$	22,500 turbines My.	Kobe	1911	..	..	..	..	6 *6-in.*, 4 *3-in.*, 4 M.	2 (sub.)	26	500 / 1000	..
„	**Itsukushima**	4277	295	$50\frac{3}{4}$	$21\frac{1}{2}$	5400 B.	La Seyne	1891	1893	..	2	12	1 *12·5-in.* (Canet), 11 *4·7-in.*, 5 *6-pr.*, 11 *3-pr.*, 6 M.	4	17·0	400	350
„	**Kasagi**	4760	$374\frac{1}{2}$	$48\frac{3}{4}$	19	13,492	Philadelphia	1898	1899	205,200	$4\frac{1}{2}$–$1\frac{3}{4}$	$4\frac{1}{2}$ shield	2 *8-in.*, 10 *4·7-in.*, 12 *12-pr.*, 6 *1·8-in.*	4	22·7 t	350 / 1000	405
t.g.b.	**Makigumo** (*ex* Posadnik)	400	$192\frac{1}{2}$	$24\frac{1}{4}$	$7\frac{1}{2}$	3600	Elbing	1892	1892	111,000	..	..	2 *1·8-in.*, 7 *1·4-in.*, 3 M.	3	22·0	90	87
Scout	**Mogami**	1329	316	$31\frac{1}{2}$	$9\frac{3}{4}$	8000 turbines	Sasebo	1907	1908	..	$2\frac{1}{2}$	..	2 *4·7-in.*, 4 *12-pr.*	2	23·0	..	180
„	**Niitaka**	3365	$235\frac{1}{2}$	44	$16\frac{1}{2}$	10,000 Nic.	Yokosuka	1902	1905	..	$2\frac{1}{2}$	..	6 *6-in.*, 10 *3-in.*, 4 *$2\frac{1}{2}$-pr.*	..	20·0	600	..
cr.	**Otawa**	3000	341	$42\frac{1}{2}$		10,000 My.	Yokosuka	1903	1904	..	..	..	2 *6-in.*, 6 *4·7-in.*, 4 *12-pr.*, 2 M., 2 l.	..	20·0	600 / 875	310
t.g.b.	**Shikinami** (*ex* Gaidamak)	400	$192\frac{1}{2}$	$24\frac{1}{4}$	$7\frac{1}{2}$	3000	Abo, Finland	1893	1894	..	..	..	2 *1·8-in.*, 7 *1·4-in.*, 10 M.	3	22·0	90	87

cr.	**Shikuma** . . .	4800	475	$46\frac{1}{2}$	$16\frac{3}{4}$	22,500 turbines My.	Sasebo . .	1911	..	..	..	..	6 *6-in.*, 4 *3-in.*, 4 M. . .	2 (sub.)	26	500 1000	..
..	**Soya** . . . (*ex* Varyag)	6500	420	52	$20\frac{3}{4}$	20,000 My.	Philadelphia .	1899	1900	..	3	..	12 *6-in.*, 12 *12-pr.*, 6 *3-pr.* .	3 (sub.)	23·0	770 1250	571
..	**Suma** . . .	2657	$306\frac{3}{4}$	40	$16\frac{1}{4}$	8500	Yokosuka . .	1896	1898	237,000	2 shield	$4\frac{1}{2}$ 4 M.	2 *6-in.*, 6 *4·7-in.*, 12 *3-pr.*,	2	20·0	200	300
,,	**Sutsuya** . . . (*ex* Novik)	3080	347	$41\frac{1}{2}$	16	18,000 My.	Danzig (Schichau)	1900	1902	..	2	..	2 *4·7-in.*, 8 other Q.F. and M.	2	25·0	600	330
t.g.b.	**Tatsuta** . . .	875	240	$27\frac{1}{2}$	13	5500	Elswick . .	1894	1894	..	..	..	2 *4·7-in.*, 4 *3-pr.* . . .	5	21·0	200	150
cr.	**Tone** . . .	4035	400	$48\frac{1}{2}$	$16\frac{3}{4}$	15,000 My.	Sasebo . .	1907	1908	..	2–3	..	2 *6-in.*, 10 *4·7-in.*, 2 *12-pr.* .	3	23·0	750 1000	392
Scout	**Tsugaru** . . . (*ex* Pallada)	6630	$413\frac{1}{4}$	$55\frac{3}{4}$	21	11,610 My.	St. Petersburg (Galerny)	1899	1902	..	$2\frac{1}{2}$	..	8 *6-in.*, 20 *12-pr.*, 8 *1-pr.* .	4	20·0	900 1400	422
..	**Tsushima** . . .	3365	$235\frac{1}{2}$	44	$16\frac{1}{2}$	10,000 Nic.	Kure . .	1902	1904	..	$2\frac{1}{2}$	..	6 *6-in.*, 10 *3-in.*, 4 *$2\frac{1}{2}$-pr.* .	..	20·0	600	320
g.b.	**Uji** . . .	620	180	$27\frac{3}{4}$	10	1000 B.	Kure . .	1903	1905	..	..	..	4 *12-pr.*, 3 M. . . .	..	13·0	100	150
cr.	**Yahagi** . . .	4800	475	$46\frac{1}{2}$	$16\frac{3}{4}$	22,500 turbines My.	Nagasaki . .	1911	..	..	..	..	6 *6-in.*, 4 *3-in.*, 4 M. . .	2 (sub.)	26	500 1000	..
S ,,	**Yodo** . . .	1230	300	32	$9\frac{3}{4}$	6500	Sasebo . .	1908	1909	..	$2\frac{1}{2}$	..	2 *4·7-in.*, 4 *12-pr.* . .	2	22·0	..	..

Repair ship Kwanto Maru. Training vessels Amagi, Maja, Manju, Kangu, Iwaki, Teuriu, Tsukushi. **Amakusa, mining vessel (*ex* Amur).** Toba, river gunboat, launched Sasebo, 1911, 25 tons, 15 knots. Mercantile auxiliaries: Umegaku Maru, Sakwra Maru, 3200 tons, 21 knots; Tsijo Maru, Teujo Maru, 13,400 tons, 20 knots.

NETHERLANDS.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
c.d.s.t.	De Ruyter . .	5014	316¾	51½	21¾	6377 *t.*	Amsterdam .	1900	1904	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·9-in.*, 4 *1·4-in.*	3 2 sub.	16·5 *t*	680	444
„	Evertsen . . .	3464	282¾	47	16¾	4735	Flushing .	1894	1896	..	6–4 H.S.	2	..	..	9½ H.S.	3 H.S.	3 *8·2-in.*, 2 *5·9-in.*, 6 *2·9-in.*, 8 *1·4-in.*	3	16·0	280	268
„	Hertog Hendrik .	5014	316¾	51½	21¾	6000 Y.	Amsterdam .	1902	1903	347,500	6 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·9-in.*, 4 *1·4-in.*, 2 l.	3	16·5	680	444
t. & b.	Jacob van Heemskerck	5211	316¾	51½	21¾	6000 Y	Amsterdam	1906	1908	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	..	2 *9·4-in.*, 6 *5·9-in.*, 10 *12-pr.*, 4 *1·4-in.*, 2 l.	3 2 sub	16·0	680	441
c.d.s.t.	Koningin Regentes	5014	316¾	51½	21¾	7290 Y.	Amsterdam .	1900	1902	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	..	2 *9·4-in.*, 4 *5·9-in.*, 6 *2·9-in.*, 4 *1·4-in.*, 2 l.	3 2 sub.	16·5	680	444
t. & b.	Koningin Wilhelmina der Nederlanden . shd.	4527	327½	48¾	20	4600	Amsterdam .	1892	1894	..	..	3	..	..	11	..	1 *11-in.*, 1 *8·2-in.*, 2 *6·6 in.*, 2 *6·6-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 2 M.	4	16·5	448	293
c.d.s.t.	Kortenaer . .	3464	282¾	47	16¾	4400	Amsterdam .	1894 1909	1896	..	6 H.S.	2	..	..	9½ H.S.	3 H.S.	3 *8·2-in.*, 2 *5·9-in.*, 6 *2·9-in.*, 8 *1·4-in.*	3	16·0	280	260
t. & b.	Marten Tromp .	5211	316¾	51½	21¾	6377 *t*	Amsterdam .	1904	1906	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·9-in.*, 4 *1·4-in.*	3 2 sub.	16·5 *t*	680	444
„	Piet-Hein . .	3464	282¾	47	16¾	4736 *t*	Rotterdam .	1894	1896	..	6 H.S.	2	..	..	9½ H.S.	3 H.S.	3 *8·2-in.*, 2 *5·9-in.*, 6 *2·9-in.*, 8 *1·4-in.*	3	16·2 *t*	280	260
„	Reinier Claeszen .	2440	229½	44¼	15	350	Amsterdam .	1891	1892	..	4¾–2 *comp.*	3	..	..	11 *comp.*	6 *comp. shield*	1 *8·2-in.* (*K.*), 1 *6·6-in.*, 1 *2·9-in.*, 4 *1·9-in.*, 3 *1·4-in.*	2	12·5 *t*	88	160
„	De Zeven Provincien	6525	339½	56	20¼	7500 Y.	Amsterdam .	1909	1910	..	6–4 K.S.	2	..	..	10 K.S.	..	2 *11-in.*, 4 *5·9-in.*, 10 *12-pr.*	..	16·0	700	440
„	A	7480	..	..	..	10000	Amsterdam .	Pro.	..	..	6–4 K.S.	2	..	..	10 K.S.	..	4 *11-in.*, 10 *4·1-in.* 10 *12pr.* 4 l.	3 sub.	18·0	..	..
a.g.b.	Three	520	171	28	9¼	1200 oil	Amsterdam .	Bldg	..	..	2 K.S.	¾	..	..	..	..	4 *4·1-in.*, 2 M.	..	16	..	..

NETHERLANDS.—Cruising Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	inches.	inches.			knots.	tons.	
g. v.	Edi (I)	787	179½	30¾	11¾	1100	Flushing	1897	1898	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	113	95
cr.	Friesland	3847	307	49	17¾	10,000 Y.	Rotterdam	1896	1898	285,700	2	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 8 *1·4-in.*, 4 smaller.	4	19·8 t	400	333
,,	Gelderland	3969	310¾	49	17¾	10,000 Y.	Feijenoord	1898	1900	..	2¼	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 4 M.	4	20·0	850	333
,,	Holland	3847	307	49	17¾	10,000 Y.	Amsterdam	1896	1898	285,700	2	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 8 *1·4-in.*, 4 M.	4	19·6 t	400	333
,,	Koetei (I)	778	179	30¾	11½	1412	Amsterdam	1898	1899	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	120	97
,,	Mataram (I)	797	179½	30¾	11¾	1100	Amsterdam	1896	1897	..	..	..	3 *4·7-in.*, 2 *3-in.*, 2 *1·4-in.*	..	13·0	113	95
,,	Noord-Brabant	3969	310¾	49	17¾	10,000 Y.	Flushing	1899	1901	..	2¼	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 4 M.	4	20·0	850	333
,,	Serdang (I)	797	179½	30¾	11¾	1100	Flushing	1897	1898	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	113	95
,,	Sumatra (I)	1693	229½	37	14	3750	Amsterdam	1890	1892	..	1½	..	1 *8·2-in.*, 1 *5·9-in.*, 2 *4·7-in.*, 1 *2·9-in.*, 4 *3-pr.*, 2 M.	..	17·0	225	183
,,	Utrecht	3969	310¾	49	17¾	10,000	Amsterdam	1898	1900	..	2¼	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 4 M.	4	20·0	850	333
,,	Zeeland	3847	307	49	17¾	10,589 Y. t	Flushing	1897	1898	285,700	2	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 8 *1·4-in.*, 4 M.	4	19·4 t	400	333

Gun-vessels of the Indian Navy: Glatik (417 tons), 1894; Havik, Snip, Sperwer, Kwartel, Favant, and Valk, launched between 1894 and 1903; Argus and Cycloop (438 tons), 1893, many older. Hydrograaf, surveying ship. Surveying vessels in the East Indies: Borneo, 787 tons, Lombok and Sumbawa, 591 tons. Mine-layers in the East Indies: Assahan, 787 tons, Siboga, 778 tons. Two (670 tons, 10 knots) mine-layers, Medusa and Hydra are in hand, and a mother ship for submarines.

NORWAY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			in.	in.			knots.	tons.	
c.d.s.	Eidsvold . / Norge .	3847	290	$50\frac{1}{2}$	$16\frac{1}{2}$	4500 Y.	Elswick	1900	1901	350,000	6 H.N.S.	2	..	..	6 H.N.S.	6 H.N.S.	2 *8·2-in.*, 6 *5·9-in.*, 8 *12-pr.*, 6 *3-pr.*	2 sub.	16·5 *t*	400 600	261
" / "	Harald Haar-fagre . / Torkenskjold	3556	280	$48\frac{1}{2}$	$16\frac{1}{2}$	3700	Elswick	1896 / 1897	1898 / 1899	300,000	7 H.S.	2	..	..	8 H.S.	..	2 *8-in.*, 6 *4·7-in.*, 6 *12-pr.*, 6 *1½-pr.*	2 sub.	17·2 *t*	200 500	248
"	Two . . .	5000	$295\frac{1}{4}$	50	$16\frac{1}{2}$	..	..	Pro.	..	..	..	..	..	..	..	..	2 *9·4-in.*, 4 *5·9-in.*, some smaller	2 sub.	15·0	..	..

Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.b.	Æger . . .	387	$108\frac{1}{2}$	$29\frac{1}{2}$	8	450	Horten .	1892	1893	..	$1\frac{1}{2}$	..	1 *8·2-in.*, 1 *2·7-in.*, 2 *1·9-in.* . .	..	9·0	..	43
g.v.	Ellida . .	984	187	$32\frac{3}{4}$	$14\frac{1}{4}$	900	Horten .	1880	1881	..	..	..	5 *5·9-in. 4-ton* (K.), 1 *4·7-in.*, 1 l., 2 M. .	1	12·0	97	128
"	Frithjof . .	1349	$216\frac{1}{2}$	$32\frac{3}{4}$	$13\frac{1}{4}$	300	Horten .	1896	1898	..	..	..	2 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 2 l. . .	3 sub.	15·0	120	156
"	Heimdal . .	620	$167\frac{1}{4}$	$26\frac{3}{4}$	$11\frac{3}{4}$	700	Christiania .	1892	1893	..	..	..	4 *2·5-in.*	..	12·0	92	62
g.v.	Viking . .	1095	$203\frac{1}{2}$	$30\frac{1}{2}$	13	2000	Horten .	1891	1892	..	$1\frac{1}{2}$	..	2 *5·9-in.* (A.), 4 *2·5-in.*, 4 *1·4-in.*, 2 M. .	3	15·0	140	156

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.H.P., armed with one large gun and machine guns in each.

PORTUGAL.—Armoured Ship.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
b.	**Vasco da Gama**	2972	233	40	18¼	6000 W.T.	Blackwall Leghorn	1876	1878 1903	132,000	9¾–4	3	6 K.S.	..	7¾ K.S.	..	2 *8-in.*, 4 *4·7-in.*, 2 *2·5-in.*, 2 *1-pr.*, 4 M.	2 (sub.)	15·5 *t*	300	218

Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	**Adamastor**	1962	250	35	14	4000	Leghorn	1896	1897	..	3	5	2 *5·9-in.*, 4 *4·7-in.*, 4 *2·2-in.*, 4 M.	3	18·0 *t*	270	232
cr.	**Almirante Reis** (ex Dom Carlos I.)	4100	360	46½	17½	12,500 Y.	Elswick	1898	1899	..	4	..	4 *5·9-in.* (A.), 8 *4·7-in.*, 12 *3-pr.*, 6 *1-pr.*, 4 M.	5 (3 sub.)	22·0	1000	260
g.v.	**Dom Luiz I.**	710	151	27¼	13¾	512	Lisbon	1895	1896	..	..	..	4 *4·1-in.*, 3 *2·5-in.*, 3 M.	..	9·9	100	120
g.v.	**Patria**	620	196¾	27½	8½	1800	Lisbon	1903	1905	..	..	..	4 *4-in.*, 6 *1·8-in.*	..	15·0	..	..
cr	**Republica.** (ex Rainha Amelia)	1640	246	36	14¾	5000 Nor.	Lisbon	1899	1901	..	1	..	4 *5·9-in.*, 2 *3·9-in.*, 2 *3-pr.*, 4 M.	2	20·6 *t*	..	250
,,	**São Gabriel**	1772	246	35½	14¼	4000 N.S.	Havre	1898	1899	..	1½	..	2 *5·9-in.* (*Canet*), 4 *4·7-in.*, 8 *1·8-in.*, 2 M.	1	17·5 *t*	500	200

About 20 small gunboats, including two gunboats of 220 tons, the Al. Baptista de Andrade and Thomaz Andrea, for Mozambique and Timor, 29 river-gunboats. Mine-layer, Vulcano, 110 ft. long, 19 ft. 6 in. beam, 400 I.H.P., 12 knots, launched by Thornycroft, 1909. Gunboat Macao, 107 tons, built by Yarrow. Lynce, fishery-protection vessel, launched at Leghorn.

RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkheads.	Armour: Gun Position: Heavy Guns.	Armour: Gun Position: Secondary.	Armament: Guns. B.L.R. are of Russian Krupp pattern.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Admiral Makaroff	7887	443	75¾	23	19,000 B.	La Seyne	1906	1908		6¾–4 K.S.	2	3 K.S.	6¾ K.S.	5¾ K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 20 *12-pr.*, 4 *6-pr.*, 6 l. and M.	2 sub.	22·5 *t*	750 / 1020	573
b.	Alexander III * (Imperator), B.S.	22,500	551¼	89½	27¼	25,000 tur.	Nikolaieff (Ivanoff)	Bldg.	..	..	..	..	..	..	..	..	12 *12-in.*, 12 *6-in.*	4 sub.	21·0	3000	..
b.	Andrei Pervozvannyi	17,200	429¾	79¾	28½	17,600 B.	St. Petersburg (Galerny)	1906	1910	1,170,000	11–6 K.S.	2½	5 K.S.	..	12 K.S.	7 K.S.	4 *12-in.*, 14 *8-in.*, 12 *4·7-in.*, 14 smaller	5 sub.	18·0	1500	933
a.c.	Bayan	7887	443	75¾	23	16,500 B.	St. Petersburg (New Admiralty)	1907	1910	..	6¾–4 K.S.	2	3 K.S.	6¾ K.S.	5¾ K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 20 *12-pr.*, 4 *6-pr.*, 6 l. and M.	2 sub.	21·0	750 / 1020	573
b.	Cesarevitch	12,912	388¾	76¼	26½	16,300 B.	La Seyne	1901	1903	..	9¾–4 K.S.	2½	6 K.S.	9 K.S.	10–11 K.S.	6¾ K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *1·8-in.*, 6 *1·4-in.*, 4 M., 2 l.	2 sub.	19·6 *t*	900 / 1350	732
b.	Ekaterina II *, B.S.	22,500	551¼	89½	27¼	25,000 tur.	Nikolaieff (Belgian Co.)	Bldg.	..	..	..	..	..	..	..	..	12 *12-in.*, 12 *6-in.*	4 sub.	21·0	3000	..
b.	Evstafi (Sviatoi), B.S.	12,733	372¼	72¾	27	10,600 B.	Nicolaieff	1906	1911	..	9–3 K.S.	2½	6 K.S.	7–5 K.S.	10 K.S.	5 K.S.	4 *12-in.*, 4 *8-in.*, 12 *6-in.*, 14 *3-in.*, 10 smaller, 6 M., 2 l.	5 sub.	16	670 / 1400	731
b.	Gangut	23,000	590½	87	27¼	42,000 Y. tur.	St. Petersburg (New Admiralty)	1911	..	..	11–4 K.S.	3	8 K.S.	4 K.S.	11½ K.S.	5 K.S.	12 *12-in.*, 16 *4·7-in.*, 4 *3-pr.*, 8 M.	4 sub.	23	1200 / 3000	..
b.	Georgi Pobiedonosetz B.S.	11,032	320	69	26½	10,600 13,468 *t*	Sebastopol	1892	1896	‡431,000	16–11	..	12	..	12	..	6 *12-in.*, 7 *6-in.*, 8 *3·9-in.*, 12 smaller Q.F. and M.	7	16·5 *t*	700	500
a.c.	Gromoboi . . shd.	13,220	473	68½	26	14,500	St. Petersburg (Baltic)	1899	1900	..	6 H.S.	3	4¾ H.S.	6 H.S.	6 H.S.	4¾ H.S.	4 *8-in.*, 22 *6-in.*, 20 *3-in.*, 11 small Q.F. and M.	4 4 sub.	20·0	2500	814

b.	**Ioann Zlatoust**, B.S. .	12,733	372¼	72¾	27	10,600 B.	Sebastopol	1906	..	..	9–3 K.S.	2½	6 K.S.	7–5 K.S.	12–10 K.S.	5 K.S.	4 *12-in.*, 4 *8-in.*, 12 *6-in.*, 14 *3-in.*, 10 smaller, 6 M., 2 l.	5	16·0	670† 1400	636
a.g.b.	**Khrabry** . . .	1735	229	41¾	11	3000 Nic.	St. Petersburg (New Admiralty)	1895	1896	..	5	1½	..	3½	..	..	2 *8-in.*, 8 Q.F. . . .	2	15·0	100	120
b.	**Maria** * (Imperatritsa), B.S.	22,500	551¼	89½	27¼	25,000 tur.	Nicolaieff (Ivanoff)	Bldg.	..	..	..	..	..	..	..	..	12 *12-in.*, 12 *6-in.* .	4 sub.	21·0	3000	..
a.c.	**Pallada** . . .	7900	413	75¾	23	16,500 B.	St. Petersburg (New Admiralty)	1906	1910	..	6¾–4 K.S.	2	3 K.S.	6¾ K.S.	5¾ K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 20 *12-pr.*, 4 *6-pr.*	5 sub.	21·0	750 1020	573
b.	**Panteleimon**, B.S. (*ex* Potemkine)	12,582	372¼	72¾	27	10,600 B.	Nicolaieff .	1900	1902	..	9–3 K.S.	2½	6 K.S.	7–5 K.S.	12–10 K.S.	5 K.S.	4 *12-in.*, 16 *6-in.*, 14 *3-in.*, 14 *1·4-in.*	5 sub.	17·0	670†	636
b.	**Pavel I** (Imperator) .	17,200	429¾	79¾	28½	17,600 B.	St. Petersburg (Baltic)	1907	1911	1,170,000	11–6 K.S.	2½	5 K.S.	..	12 K.S.	7 K.S.	4 *12-in.*, 14 *8-in.*, 12 *4·7-in.*, 14 smaller.	5 sub.	18·0	1500	933
b.	**Petropavlovsk** .	23,000	590½	87	27¼	42,000 Y. tur.	St. Petersburg (Baltic)	1911	..	2,800,000	11–4 K.S.	3	8 K.S.	4 K.S.	11½ K.S.	5 K.S.	12 *12-in.*, 16 *4·7-in.*, 4 *3-pr.*, 8 M.	4 sub.	23·0	1200 3000	...
b.	**Poltava** . .	23,000	590½	87	27¼	42,000 Y. tur.	St. Petersburg (New Admiralty)	1911	..	2,800,000	11–4 K.S.	3	8 K.S.	4 K.S.	11½ K.S.	5 K.S.	12 *12-in.*, 16 *4·7-in.*, 4 *3-pr.*, 8 M.	4 sub.	23·0	1200 3000	...
a.c.	**Rossia** . . shd.	12,130	480	68½	26	14,500 B.	St. Petersburg	1896	1897	..	10–5 H.S.	2½	4 H.S.	6 H.S.	2 H.S.	2 H.S.	4 *8-in.*, 22 *6-in.*, 19 smaller Q.F. & M.	2	20·0	2500 §	725
b.	**Rostislav**, B.S. . .	8880	341	66½	24	8700	Nicolaieff .	1896	1900	..	15¾–8 H.S.	2–3	5 H.S.	5 H.S.	15¾ H.S.	6 H.S.	4 *10-in.*, 8 *6-in.* (Canet), 30 smaller Q.F. & M.	6	16·0	§550 800	624
a.c.	**Rurik** . . .	15,170	490	75	26	19,700 B.	Barrow .	1906	1907	..	6–3 K.S.	1½	3 K.S.	3 K.S.	8 K.S.	7 K.S.	4 *10-in.*, 8 *8-in.*, 20 *4·7-in.*, 12 smaller.	2 sub.	21·0	1200 2000	800
b.	**Sevastopol** . . .	23,000	590½	87	27¼	42,000 Y. tur.	St. Petersburg (Baltic)	1911	..	2,800,000	11–4 K.S.	2	8 K.S.	4 K.S.	11½ K.S.	5 K.S.	12 *12-in.*, 16 *4·7-in.*, 4 *3-pr.*, 8 M.	4 sub.	23·0	1200 3000	...
b.	**Sinope**, B.S. . .	10,180	331	69	26½	13,000 B.	Sebastopol .	1887	1890	900,000	16–11 *comp.*	3	14 *comp.*	12	14 *comp.*	..	6 *12-in.*, 7 *6-in.*, 8 Q.F., 6 M.	7	16·75	886	325
b.	**Slava** . . .	13,516	367½	76	26	16,000 B.	St. Petersburg (Baltic)	1903	1905	..	9–4 K.S.	4	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	2 sub.	18·0	1250 2000	740
b.	**Tria Sviatitelia**, B.S.	13,318	357½	72¼	27	10,600	Nicolaieff .	1893	1897	..	16 H.S.	3	16 H.S.	12 H.S.	16 H.S.	5 H.S.	4 *12-in.*, 8 *6-in.*, 4 *4·7-in.*, 50 smaller Q.F. & M.	6 2 sub.	18·0 *t*	1000	582

* Some particulars uncertain. † And liquid fuel, 580 tons. ‡ Exclusive of armament. § And liquid fuel.

It is anticipated that four battle-cruisers of 28,000 tons, with a main armament of 14-in. guns, will be laid down in 1912—two at Galerny Island and two at the Baltic yard.

RUSSIA.—Cruising Ships, &c.

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
to.g.b.	**Abrek**	535	212¼	24¾	9	4506 *t*	Abo	1896	1897	53,600	½	..	2 *3-in.*, 4 *1·8-in.*	2	21·2 *t*	..	..
3rd cl. *cr.*	**Almaz**	3285	325	43½	17½	7500 B.	St. Petersburg (Baltic)	1903	1904	..	2¾	5–3½ K.S.	3 *4·7-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 2 M.	6	19·0	560	340
2nd cl. *cr.*	**Askold**	5905	426½	49¼	20¾	24,000 T.S.	Kiel (Germania)	1900	1901	..	3	4	12 *6-in.*, 12 *3-in.*, 6 *1·8-in.*, 8 smaller Q.F. and M.	6 (2 sub.)	23·8 *t*	720 / 1100	500
2nd cl. *cr.*	**Aurora**	6731	413¼	55¾	21	11,610 B.	St. Petersburg (Galerny)	1900	1903	..	2½	..	8 *6-in.*, 20 *3-in.*, 14 smaller Q.F. and M.	3 (2 sub.)	20·0	900 / 1400	422
g.b.	**Bobr**	875	215¼	35¾	9	800	St. Petersburg (New Admiralty)	1907	1908	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	1	12·0	60	170
2nd cl. *cr.*	**Bogatyr**	6645	416¾	54½	20¾	20,300 Nor.	Stettin (Vulcan)	1901	1902	..	2	5 N.S.	12 *6-in.*, 12 *3-in.*, 6 *1·8-in.*, 8 smaller Q.F. and M.	4 (2 sub.)	24·0 *t*	720 / 1100	580
2nd cl. *cr.*	**Diana**	6630	413¼	55¾	21	11,610 B.	St. Petersburg (Galerny)	1899	1902	..	2½	..	10 *6-in.*, 20 *3-in.*, 18 smaller Q.F. and M.	3 (2 sub.)	20·0	900 / 1400	422
g.b.	**Gilyak**	875	215¼	35¾	9	800	St. Petersburg (New Admiralty)	1906	1908	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	1	12·0	60	170
3rd cl. *cr.*	**Jemchug**	3106	347¾	41½	16	17,000 Y	St. Petersburg (Nevsky)	1903	1904	..	2	..	8 *4·7-in.*, 6 *1·8-in.*, 5 smaller Q.F. and M.	3	23·0	600	340
2nd cl. *cr.*	**Kagul, B.S.** (ex-Otchakoff)	6675	439	54½	20½	19,500 Nor.	Sebastopol	1902	1905	..	2¾	5–3½ K.S.	12 *6-in.*, 12 *3-in.*, 14 smaller	2 sub.	23·0	720 / 1100	570
to.g.b.	**Kazarsky, B.S.**	400	190	24	8½	3500	Elbing	1890	1891	32,500	..	..	9 *1·8-in.* (Hotchkiss)	2	23·0	90	60
g.b.	**Koreiets**	875	215¼	35¾	9	800	St. Petersburg (New Admiralty)	1906	1908	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	1	12·0	60	170

to.cr.	**Novik**	1260	$329\frac{1}{4}$	$40\frac{1}{4}$	10	36,000 tur.	Putiloff	1911	..	..	..	..	10 *4-in.*, 4 M.	4	36	..	..
2nd cl. *cr.*	**Oleg**	6675	$439\frac{3}{4}$	$54\frac{1}{2}$	$20\frac{1}{2}$	19,500 Nor.	St. Petersburg (New Admiralty)	1903	1904	..	$2\frac{3}{4}$	$5–3\frac{1}{2}$	12 *6-in.*, 12 *3-in.*, 14 smaller, Q.F., & M.	2 (sub.)	23·0	600	340
2nd cl. *cr.*	**Pamyat Mercuria,** B.S. (ex-Kagul)	6675	439	$54\frac{1}{2}$	$20\frac{1}{2}$	19,500	Nicolaieff	1903	1907	..	$2\frac{3}{4}$	$5–3\frac{1}{2}$ K.S.	12 *6-in.*, 12 *3-in.*, 14 smaller, Q.F., & M.	2 (sub.)	23·0	720	..
to.g.b.	**Posadnik**	394	$192\frac{1}{2}$	$24\frac{1}{4}$	$7\frac{1}{2}$	3600	Elbing	1892	1894	111,000	..	..	2 *1·8-in.*, 7 *1·4-in.*, 3 M.	2	22·0	90	87
g.b.	**Sivoutch**	875	$215\frac{1}{4}$	$35\frac{3}{4}$	9	800	St. Petersburg. (New Admiralty)	1906	1908	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	..	12·0	60	170
cr.	**Vitiaz**	6375	414	$52\frac{1}{2}$	$20\frac{3}{4}$	20,000 B.	St. Petersburg (Galerny)	Bldg.	..	..	$2\frac{3}{4}$	$5–3\frac{1}{2}$ K.S.	12 *6-in.*, 12 *3-in.*, 8 *1·8-in.*	5 (2 sub.)	23·0	720	..
to.g.b.	**Voevoda**	415	$192\frac{1}{2}$	$24\frac{1}{4}$	$7\frac{1}{2}$	3600	Elbing	1892	1893	111,000	..	..	2 *1·8-in.*, 7 *1·4-in.*, 3 M.	2	22·0	90	87

Okean, *coal transport*, 12,000 tons, 18 knots, launched at Kiel, 1901. Torpedo transports and mining vessels Minin, General Admiral, Gerzog Edinburgski, Volga, Bakan, Yenessei, Amur, Ladoga, Narova, Onega and Prut. Eight river gunboats (946 tons) building for the Amur, Grosa, Shkwol, Shtorm, Taifun, Smertsh, Uragan, Viehrj, Vjuga. Gunboats for the Caspian, Kars and Ardagan, completed 1911. Rynda (1885), 3508 tons, training ship. A submarine salvage vessel is in hand for the Baltic.

Volunteer Fleet.—Saratoff, 8556 reg. tons, Petersburg, 9252 reg. tons, Kherson, 10,225 reg. tons, Don, 8430 reg. tons, Kuban, 8480 reg. tons, Smolensk, 11,850 reg. tons, Terek, 7241 reg. tons, all of $18\frac{1}{2}$ or greater speed. Vessels of the Black Sea Shipping Company are available for transport purposes.

SPAIN.—Armoured Ships.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Alfonso XIII.	15,460	435	$78\frac{3}{4}$	$25\frac{1}{2}$	15,300Y. P. tur.	Ferrol	Bldg.	..	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	6 K.	8 *12-in.*, 20 *4-in.*, 2 *3-pr.*, 2 l., 2 M.	..	19·5	800 / 1900	700
a.c.	Cataluña	6889	$347\frac{3}{4}$	61	$21\frac{3}{4}$	15,000	Cartagena	1900	..	600,000	12–10	2	..	12	$10\frac{1}{2}$	..	2 *11-in.*, 10 *5·5-in.*, 2 *2·7-in.*, 4 *2·2-in.*, 4 *1·4-in.*, 2 M.	5 sub.	20·0	1200	484
”	Emperador Carlos V	9089	380	67	25	18,500	Cadiz (Vea Murguia)	1895	1898	734,000	2	$6\frac{1}{2}$–2	2	..	10	2	2 *11-in.* (Hontoria), 8 *5·5-in.*, 4 *3·9-in.*, 2 *2·7-in.*, 4 *2·2-in.*, 6 M.	6	20·0	1200	535
b. *b.*	España Jaime I.	15,460	435	$78\frac{3}{4}$	$25\frac{1}{2}$	15,300Y. P. tur.	Ferrol	1912 Bldg.	..	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	6 K.	8 *12-in.*, 20 *4-in.*, 2 *3-pr.*, 2 l., 2 M.	..	19·5	800 / 1900	700
b.	Pelayo	9744	330	66	25	9000 Nic.	La Seyne	1887	1890 1897	..	$17\frac{3}{4}$	4	..	..	$19\frac{1}{4}$	4 H.S.	2 *12·5-in.*, 2 *11-in.*, 9 *5·5-in.*, 6 smaller, 12 M.	7	16·0	800	600
a.c.	Princesa de Asturias	6889	$347\frac{3}{4}$	61	$21\frac{3}{4}$	15,000	Carraca	1896	..	600,000	12–10	2	..	12	$10\frac{1}{2}$	..	2 *11-in.*, 10 *5·5-in.*, 2 *2·7-in.*, 4 *2·2-in.*, 4 *1·4-in.*, 2 M.	5	20·0	1200	500

SPAIN.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
g.b.	Bonifaz	800	200	30	..	1100 Y	Cartagena	Bldg.	..	..	..	..	4 *3-in.*, 2 M.	..	13·0	..	..
to.g.b.	Don Alvaro de Bazán	810	233	$26\frac{3}{4}$	22	2500	Ferrol	1897	1899	..	..	..	2 *4·7-in.* (Hontoria), 4 *1·6-in.*, 2 M.	4	19·0	..	110
,,	Doña María de Molina	810	233	$26\frac{3}{4}$	22	2500	Ferrol	1896	1898								
cr.	Extremadura	2030	290	36	14	7000 T	Cadiz	1900	1902	..	2	..	8 *4-in.* (Vickers), 4 *2·2-in.*, 2 *1·4-in.*, 1 l.	..	20·0	430	246
g.b.	Lauria	800	200	30	..	1100 Y	Cartagena	Bldg.	..	..	..	..	4 *3-in.*, 2 M.	..	13·0	..	..
,,	Laya							Bldg.	..								
cr.	Lepanto	4750	$318\frac{1}{2}$	$50\frac{1}{2}$	20	12,000	Cartagena	1892	1895	..	$4\frac{3}{4}$	..	4 *7·8-in.* (Hontoria), 6 *4·7-in.*, 6 *6-pr.*, 4 *3-pr.*, 5 M.	5	20·0	1100	276
to.g.b.	Marqués de la Victoria	810	233	$26\frac{3}{4}$	22	2500	Ferrol	1897	1900	..	..	..	2 *4·7-in.* (Hontoria), 4 *1·6-in.*, 2 M.	4	19·0	..	110
g.r.	Marqués de Molíns	562	190	23	$10\frac{1}{4}$	2600	Ferrol	1891	1893	..	..	..	2 *4·7-in.* (Hontoria), 4 *2·2-in.*, 1 M.	2	12·0	106	80
,,	Martin Alonso Pinzón							1892	1893								
g.b.	Recalde	800	200	30	..	1100 Y	Cartagena	1911	..	..	..	..	4 *3-in.*, 2 M.	..	13·0	..	..
cr.	Reina Regente	5287	337	529	$19\frac{3}{4}$	6500 W.T.	Ferrol	1906	1908	..	..	3	10 *5·5-in.*, 12 *2·2-in.*, 2 l., 8 M.	3	20·0	1200	497
..	Rio de la Plata . shd.	1773	246	$35\frac{1}{4}$	15	7100 N.S.	Havre	1898	1899	..	..	1	2 *5·5-in.*, 4 3 *9-in.*, 4 *2·2-in.*, 6 M.	2	20·0	270	213
g.r.	Vincente Yáñez Pinzón	562	190	23	$10\frac{1}{4}$	2600	Ferrol	1891	1892	..	..	..	2 *4·7-in.* (Hontoria), 4 *2·2-in.*, 1 M.	2	12·0	106	80

Hernán Cortés, Vasco Nuñez de Balboa, Ponce de Léon, MacMahon, Perla, Destructor, Nueva España and Temerario, gunboats.

SWEDEN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s., t.	**Aeran** . .	3612	287	49¼	16½	6500 Y.	Gothenburg	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	17·2 t	370	250
,,	**Dristigheten** .	3445	285	48½	16	5400 Y	Gothenburg	1900	1901	..	8 K.S.	1⅞	..	..	8 N.S.	3¾ K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 M.	2 sub.	16·5	300	250
a.c.	**Fylgia** . .	4100	377¼	48¾	16	12,440 Y. t	Stockholm .	1905	1907	385,700	4 K.S.	2	..	..	5 K.S.	..	8 *5·9-in.*, 14 *2·2-in.*, 3 *1·4-in.* .	2	22·5 t	350 / 900	321
c.d.s., t.	**Göta** . .	3238	258½	48	16¾	4750	Gothenburg	1890 1902	1891	..	11¾–8	2	..	..	7½ H.S.	5 H.S.	1 *8·2-in.*, 7 *5·9-in.*, 11 *2·2-in.*, 2 *1·4-in.*	3	16·0	240	150
,,	**Manligheten** .	3612	287	49¼	16½	7400 Y.	Malmö .	1904	1906	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2 2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	17·0	370	250
,,	**Njord** . .	3445	278¼	48½	17½	5350	Gothenburg	1898	1899	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	4 H.N.S.	2 *9·8-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 4 M.	1	16·5	275	200
,,	**Oden** . . .	3445	278¼	48½	17½	5330	Stockholm .	1896	1898	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	4 H.N.S.	2 *9·8-in.*, 4 *4·7-in.*, 10 *2·2-in.*, 4 M.	1	16·5	275	200
,,	**Oscar II** . .	4203	313¾	49½	16¾	8500 Y.	Gothenburg	1905	1907	..	6 K.S.	2	6 K.S.	6 K.S.	7½ K.S.	5 K.S.	2 *8·2-in.*, 8 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	18·0	350 500	326
,,	**Svea** . .	3051	248¼	49¼	17	3640	Gothenburg	1886 1904	1887	..	11¾–8	2	..	..	7½ H.S.	5 H.S.	1 *8·2-in.*, 7 *5·9-in.*, 11 *2·2-in.*, 2 *1·4-in.*	1	14·7 t	220	268
,,	**Tapperheten** .	3612	287¼	49¼	16½	6000 Y.	Malmö .	1901	1904	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	16·5	370	250
,,	**Thor** . . .	3445	278¼	48½	17½	5350	Stockholm .	1898	1890	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	3¾ H.N.S.	2 *9·8-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 4 M.	1	16·5	275	200
,,	**Thule** . .	3248	260¾	48	16¾	4740	Stockholm .	1892 1904	1894	..	11¾–8	1⅞	..	..	7½ H.S.	5 H.S.	1 *8·2-in.*, 7 *5·9-in.*, 11 *2·2-in.*, 2 *1·4-in.*	2	16·2 t	250	165
,,	**Wasa** . .	3612	287	49¼	16½	6000 Y.	Stockholm .	1901	1893	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	16·5	370	250
,,	Unnamed . .	6800	390½	61	21½	17,500 Y.	Stockholm .	Pro.	..	666,000	8–6 K.S.	1½	..	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *6-in.*, 6 *12-pr.*, 4 *1-pr.*	2 sub.	22·0	350 / 800	450

The old coast-defence ships John Ericsson, Thordön, and Tirfing, 1500 tons, Loke, 1600 tons, and the armoured gunboats Berserk, Björn, Folke, Gerda, Hildur, Sölve and Ulf, 460 tons.

SWEDEN.—Cruising Ships, &c.

Class.	NAME	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.										knots.	tons.	
to.g.b.	Claes Horn	787	222	27	10¼	3600	Stockholm	1899	1900	..	..	..	2 *4·7-in.*, 4 *2·2-in.*	1 sub.	20·0	..	100
,,	Claes Uggla	787	232	27¼	8¾	4500 Y.	Stockholm	1900	1901	..	..	..	2 *4·7-in.*, 4 *2·2-in.*	1	20·5	..	100
to.g.b.	Jacob Bagge	787	222	27	10¼	3970	Malmö	1898	1899	..	..	..	2 *4·7-in.*, 4 *2·2-in.*	1 sub.	19·5	..	100
	Örnen					4100	Gothenburg	1896	1897						19·5		
,,	Psilander	787	232	27¼	8¾	4500 Y.	Stockholm	1900	1901	..	..	..	2 *4·7-in.*, 4 *2·2-in.*	1 sub.	20·5 *t*	..	100

Four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 5-in. B.L.R. and 2 M. Mine layers, Clas Fleming, building by Bergsund, Stockholm & Edda. 549 tons (1885).

TURKEY.—Armoured Ships.

Class	NAME.	Displacement.	Length.	Beam.	Draugh	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.b.	Assar-i-Tewfik	4613	272¼	52½	25	3560	La Seyne	1868	1870 1906	..	8	..	..	..	6	..	3 *5·9-in.*, 7 *4·7-in.*, 6 *6-pr.*	..	13·0	400	..
b.	Kheyr-ed-Din Bar-barossa *	9901	354¼	65	24¾	9000	Wilhelms-haven	1891	1894	450,000	15¾ comp.	2½	..	..	11¾ comp.	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 4 M.	3	17·0	630 1000	..
,,	Messoudieh	9120	331½	59	25¾	11,000 Nic.	Thames Genoa	1874	1876 1901	..	12	1	12	..	6–9	12	2 *9·2-in.*, 12 *6-in.*, 14 *3-in.*, 10 *6-pr.*, 2 *3-pr.*, 2 l.	..	17·5 *t*	600	..
t. t.	Reshad-i-Hamiss Reshad V.	23,000	525	91	..	31,000 P. tur.	Barrow Elswick	Bldg.	..	..	12–6 K.S.	3	9–8 K.S.	12 K.S.	12 K.S.	5 K.S.	10 *13·5-in.*, 16 *6-in.*	5 sub.	21·0	..	..
,,	Turgut Reis †	9901	354¼	65	24¾	9000	Stettin (Vulcan)	1891	1893	450,000	15¾ comp.	2½	..	..	11¾ comp.	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 4 M.	3	17·0	630 1000	..

* Ex Kurfürst Friedrich Wilhelm. † Ex Weissenburg.

Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
to. cr.	Berk-i-Satvet	740	262½	27½	..	5100	Kiel (Germania)	1906	1907	..	..	..	2 *4-in.*, 6 *6-pr.*, 2 M., 2 l.	3	22	240	..
cr.	Hamidieh	3800	340	47½	16	12,500 Nic.	Elswick	1903	1904	..	4–1½	..	2 *6-in.*, 8 *4·7-in.*, 6 *1·8-in.*, 6 M.	2	22·2 *t*	600	300
to. cr.	Heibetnuma	1960	226	37	14	2500 ind.	Turkey	1890	1893	..	..	..	3 *5·9-in.* (K.), 6 *4·7-in.*, 6 Q.F.	2	14·0	..	..
g.v.	Lutfi-Hamayoun	1313	210	35	14	2800	Turkey	1892	1894	..	..	..	4 *6-in.* (K.), 6 *4·7-in.*, 6 Q.F.	2	13·0	..	..
cr.	Medjidieh	3432	331¼	42	16	12,000 Nic.	Philadelphia	1903	1904	..	4–1½	..	2 *6-in.*, 8 *4·7-in.*, 6 *1·8-in.*, 6 M.	2	22·2	600	300
to. cr.	Peik-i-Shevket	740	262½	27½	..	5100	Kiel (Germania)	1906	1907	..	..	..	2 *4-in.*, 6 *6-pr.*, 2 M., 2 l.	3	22	240	..
,,	Pelenk-i-deria	840	236¼	31	16½	5000	Kiel (Germania)	1890	1891	..	..	¼	2 *4-in.* (K.), 16 M.	2	20·0	..	111

Seven gunboats (510–420 tons) have been bought in France (1911).

UNITED STATES.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
t.	Alabama	11,565	368	$72\frac{1}{4}$	26	11,207 *t*	Philadelphia	1898	1900	514,539	$16\frac{1}{2}$–4 H.S.	$2\frac{3}{4}$–4	$5\frac{1}{4}$ H.S.	12 H.S.	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 2 *1-pr.*, 4 M., 2 l.	..	17·0 *t*	800 1275	592
b.	Arkansas	26,000	554	$93\frac{1}{4}$	$28\frac{1}{2}$	28,000 P. tur.	Camden, N.J.	1911	..	964,000	11–5 K.S.	3	..	8–6 K.S.	11 K.S	$6\frac{1}{2}$	12 *12-in.*, 21 *5-in.*, 4 *3-pr.*, 2 M., 2 l.	2 (sub.)	20·5	1650 2500	1115
a. c.	Brooklyn	9215	$400\frac{1}{2}$	62	$26\frac{1}{4}$	18,425 *t*	Philadelphia	1895	1896	613,583	3 H.S.	6–3	4 H.S.	..	8 H.S.	$5\frac{1}{2}$ H.S.	8 *8-in.*, 12 *5-in.*, 12 *6-pr.*, 4 *1-pr.*, 4 M., 2 l.	..	22·2 *t*	900 1622	718
,,	California	13,680	502	$69\frac{1}{2}$	$24\frac{1}{2}$	29,381 *t* B. & W.	S. Francisco.	1904	1907	756,000	6–$3\frac{1}{2}$ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 (sub.)	22·2 *t*	900 2000	829
,,	Charleston	9700	424	66	$25\frac{1}{2}$	27,200 B.&W.	Newport News	1904	1906	563,030	4 H.S.	3	4 H.S.	..	4 H.S.	..	14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·0	650 1500	664
,,	Colorado	13,680	502	$69\frac{1}{2}$	$24\frac{1}{2}$	26,837 Nic.	Philadelphia	1903	1905	756,000	6–$3\frac{1}{2}$ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 (sub.)	22·2 *t*	900 2000	829
t.	Connecticut	16,000	450	$76\frac{3}{4}$	$26\frac{3}{4}$	20,525 B. & W.	Camden, N.J.	1904	1906	819,300	$11\frac{1}{2}$ K.S.	3	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 (sub.)	18·8 *t*	900 2200	803
t.	Delaware	20,000	510	$85\frac{1}{4}$	27	29,025	Newport News	1909	1910	817,300	11 K.S.	..	10–8 K.S.	..	11 K.S.	5 K.S.	10 *12-in.*, 14 *5-in.*, 2 *3-pr.*, 2 l., 12 M.	2 (sub.)	21·5 *t*	1000 2500	927
t.	Florida	21,825	510	$88\frac{1}{4}$	27	28,000 tur.	New York	1910	1911	1,280,000	11	..	10	..	11	5	10 *12-in.*, 16 *5-in.*, 4 *3-pr.*, 4 M., 2 l.	2 (sub.)	21·0	1000 2300	1014
Super-posed turrets.	Georgia	14,948	435	$76\frac{1}{4}$	$23\frac{3}{4}$ †	25,088 *t* Nic.	Bath, Me.	1904	1906	737,700	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 (sub.)	19·2 *t*	900 1704	812
b.	Idaho	13,000	375	77	25	14,235 B. & W.	Philadelphia	1905	1908	616,360	9–4 K.S.	3–$1\frac{1}{2}$	7 K.S.	7 K.S.	10–$7\frac{1}{2}$ K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 8 *7-in.*, 12 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	2 (sub.)	17·2 *t*	600 1750	725
t.	Illinois	11,565	368	$72\frac{1}{4}$	26	12,757	Newport News	1898	1901	533,237	$16\frac{1}{2}$–4 H.S.	$2\frac{3}{4}$–4	$5\frac{1}{4}$ H.S.	12 H.S.	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 6 *1-pr.*, 4 M., 2 l.	..	17·45 *t*	800 1275	686
b.	Indiana	10,288	348	$69\frac{1}{4}$	$27\frac{1}{4}$	9,607 B. & W.	Philadelphia	1893	1895	620,569	18 H.S.	$2\frac{3}{4}$	5 H.S.	17 H.S.	17 H.S.	10 H.S.	4 *13-in.*, 8 *8-in.*, 12 *3-in.*, 4 *6-pr.*, 2 M., 1 l.	..	15·5 *t*	400 1567	497

* The sums given in this column are exclusive of the cost of armour and armament according to the system of making appropriations in the estimates. † Mean draught.

UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b	Iowa .	. 11,340	360	72¼	26¾	11,933	Philadelphia	1896	1897	618,514	14 H.S.	2¾	5 H.S.	12 H.S.	15 H.S.	8–6 H.S.	4 *12-in.*, 8 *8-in.*, 10 *4-in.*, 4 *6-pr.*, 6 M., 2 l.	..	17·1 *t*	625 / 1795	520
t.	Kansas .	. 16,000	450	77	26¾	19,545 B. & W.	Camden, N. J.	1905	1907	855,850	8–11 K.S.	3–4½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 (sub.)	18·1 *t*	900 / 2200	854
super-posed turrets	Kearsarge / Kentucky	11,540	368	72¼	25¾	11,788 / 12,179	Newport News	1898	1899	462,345 each	16½–4 H.S.	2¾–5	5½ H.S.	..	15 H.S.	9 H.S.	4 *13-in.*, 4 *8-in.*, 14 *5-in.*, 20 *6-pr.*, 8 *1-pr.*, 4 M., 2 l.	1 / ..	16·8 / 16·9 *t*	410 / 1591	690 / 686
t.	Louisiana	. 16,000	450	76¾	26¾	20,748 B. & W.	Newport News.	1904	1906	819,300	11–8 K.S.	3	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 L.	4	18·8 *t*	900 / 2200	803
,,	Maine .	. 12,300	388	72¼	25½	15,693 Nic.	Philadelphia	1901	1902	592,828	11–4 K.S.	2¾–4	6 K.S.	10 K.S.	12 K.S	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 6 *1-pr.*, 2 M., 2 l.	2 sub.	18·0 *t*	1000 / 1800	551
a c.	Manhattan .	8200	380½	64¾	27½	17,075	Philadelphia	1891	1893 1909	613,377	4 H.S.	2½	.. K.S.	..	6½ H.S.	5–4 H.S.	4 *8-in.*, 10 *5-in.*, 8 *12-pr.*, 4 *3-pr.*, 4 M.	..	21·0 *t*	750 / 1334	498
a.c.	Maryland	. 13,680	502	69½	24½	28,059 B. & W.	Newport News.	1903	1905	756,400	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·4 *t*	900 / 1850	829
b.	Massachusetts	10,288	348	69¼	27⅓	10,240	Philadelphia	1893	1896	620,569	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10–5 H.S.	4 *13-in.*, 8 *8-in.*, 12 *3-in.*, 4 *6-pr.*, 2 M., 2 l.	..	16·2 *t*	400 / 1560	509
,,	Michigan	. 16,000	450	80¼	24½	16,310 B. & W.	Camden, N.J.	1908	1909	700,000	11–9	3	8	10	10–8	8	8 *12-in.*, 22 *3-in.*, 2 *3-pr.*, 12 M., 2 l.	2 sub.	18·8 *t*	900 / 2200	669
a.c.	Milwaukee .	9700	424	66	25½	24,166 W.T.	S. Francisco.	1904	1906	580,500	4 H.N.S.	3	4 H.N.S.	..	4 H.N.S.	..	14 *6-in.*, 18 *14-pr.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	2 sub.	22·2 *t*	650 / 1500	664
t.	Minnesota	. 16,000	450	77	26¾	20,235 B. & W.	Newport News	1905	1907	844,500	8–11 K.S.	3–4½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	18·8 *t*	900 / 2200	881
b.	Mississippi	. 13,000	375	77	24¾	13,607 B. & W.	Philadelphia	1905	1908	616,360	9–4 K.S.	3–1½	7 K.S.	7 K.S.	10–7½ K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 8 *7-in.*, 12 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	2 sub.	17·11 *t*	600 / 1750	725
t.	Missouri	. 12,300	388	72¼	25½	15,845 T.	Newport News	1901	1903	592,828	12–4 K.S.	2¾–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 4 *1-pr.*, 2 M., 2 l.	2 sub.	18·1 *t*	1000 / 1836	551
a.c.	Montana	. 14,500	502	72¾	25	27,938 B. & W.	Newport News	1906	1908	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4 sub.	22·2 *t*	900 / 2000	845

c.d.s.,t.	Monterey	4084	256	59	15¼	5244 B. & W.	S. Francisco	1891	1893	345,731	13–6 H.S.	3	..	..	13 H.S.	..	2 *12-in.*, 2 *10-in.*, 6 *6-pr.*, 4 *1-pr.*, 2 M.	..	13·6 *t*	200 233	218
Super-posed turrets.	Nebraska	14,948	435	76¼	23¾ †	21,283 B. & W.	Seattle	1904	1907	767,210	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·1 *t*	900 1900	812
b.	Nevada §	27,500	575	95	28½	35,000 Cur. tur.	Quincy, Mass.	Bldg.	..	2,200,000	13½ K.S	3	10–8 K.S.	13½ K.S.	13 K.S.	5 K.S.	10 *14-in.*, 22 *5-in.*, 6 smaller	4 sub.	21·0	1300 2000	..
t.	NewHampshire	16,000	450	77	26¾	19,100 B. & W.	Camden, N.J.	1906	1908	1,600,000 (Total)	9–4 K.S.	3	7 K.S.	7 K.S.	12 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 12 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4 sub.	18·2 *t*	900 2350	916
Super-posed turrets.	New Jersey	14,948	435	76¼	23¾ †	23,089 B. & W.	Quincy, Mass.	1904	1906	699,680	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·4 *t*	900 1900	812
b.	New York	27,000	573	95¼	28½ †	35,000	New York	Bldg.	..	..	12–1 K.S.	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.*, 21 *5-in.*	2 sub.	21·0	2200 2850	1014
a.c.	North Carolina	14,500	502	72¾	25	29,785 B. & W.	Newport News	1906	1908	970,630‡	5–3 K.S.	3	5 K.S.	9 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4 sub.	22·48 *t*	900 2000	845
b.	North Dakota	20,000	510	85	27	31,400 Cur. tur.	Quincy, Mass.	1908	1910	899,500	11 K.S.	..	10–8 K.S.	..	11 K.S.	5 K.S.	10 *12-in.*, 14 *5-in.*, 2 *3-pr.*, 2 l., 12 M.	2 sub.	21·6 *t*	1000 2500	960
t.	Ohio	12,440	388	72¼	25½	16,220 T.	S. Francisco	1901	1904	595,705	11·1 K.S.	3–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 6 *1-pr.*, 2 M., 2 l.	2 sub.	17·8 *t*	1000 2144	521
b.	Oklahoma §	27,500	575	95	28½	35,000	New York	Bldg.	..	2,200,000	13½ K.S.	3	10–8 K.S.	13½ K.S.	13 K.S.	5 K.S.	10 *14-in.*, 22 *5-in.*, 6 smaller	4 sub.	21·0	1300 2000	..
b.	Oregon	10,288	348	69¼	27¼	11,037	S. Francisco	1893	1896	653,447	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10–5 H.S.	4 *13-in.*, 8 *8-in.*, 20 *6-pr.*, 2 *1-pr.*, 4 M.	..	16·8 *t*	400 1594	500
a.c.	Pennsylvania	13,680	502	69½	24½	28,600 Nic.	Philadelphia	1903	1905	799,310	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·4 *t*	900 2000	829
c.d.s. (2 t.)	Puritan	6060	290¼	60	18½	3,700	Chester	1882 reblt.	1896	..	14–6 H.S.	2	..	..	14 H.S.	..	4 *12-in.*, 6 *4-in.*, 6 *6-pr.*, 2 *1-pr.*, 4 M.	..	12·4 *t*	307	230
Super-posed	Rhode Island	14,948	435	76¼	23¾ †	20,310 B. & W.	Quincy, Mass.	1904	1906	699,680	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·0 *t*	900 1900	812
a.c.	St. Louis	9700	424	66	25½	27,264 B. & W.	Philadelphia (Cramp)	1905	1906	563,030	4 K.S.	3	4–3	..	4 K.S.	..	14 *6-in.*, 18 *14-pr.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·3 *t*	650 1500	664
b.	South Carolina	16,000	450	80¼	24½	18,357 B. & W.	Philadelphia (Cramp)	1908	1909	700,000	11–9	3	8	10	10–8	8	8 *12-in.*, 22 *3-in.*, 2 *3-pr.*, 12 M., 2 l.	2 sub.	18·9 *t*	900 2200	669

* See note on page 239. † Mean draught ‡ Including armour, but not armament. § Details uncertain ; oil fuel.

UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.						in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	South Dakota.	13,680	502	69½	24½	28,598 B. & W.	S. Francisco.	1904	1907	770,570	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·0 *t*	900 / 2000	829
a.c.	Tennessee .	14,500	502	72¾	25	26,963 B. & W.	Philadelphia	1904	1906	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	4 sub.	22·1 *t*	900 / 2000	858
b.	Texas . .	27,000	573	95¼	28½	35,000	Newport News	Bldg.	..	1,166,000	12–4 K.S.	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.*, 21 *5-in.*	2 sub.	21·0	2200 / 2850	1014
b.	Utah .	21,825	510	88¼	28½	28,477 *t.*, P. tur.	Camden, N.J.	1909	1911	813,500	11	..	10	..	11	5	10 *12-in.*, 16 *5-in.*, 4 *3-pr.*, 4 M., 2 l.	2 sub.	21·6 *t*	1000 / 2300	1014
t.	Vermont .	16,000	450	77	26¾	17,982 B. & W.	Quincy, Mass.	1905	1907	858,730	8–11 K.S.	3–4½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	18·33 *t*	900 / 2200	854
Super-posed	Virginia .	14,948	435	76¼	23¾ †	22,841 Nic.	Newport News	1904	1906	737,700	11–8 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·0 *t*	900 / 1900	812
a.c.	Washington .	14,500	502	72¾	27	27,152 B. & W.	Camden, N.J.	1905	1906	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	4 sub.	22·3 *t*	900 / 2000	858
,,	West Virginia	13,680	502	69½	24½	26,135 B. & W.	Newport News	1903	1905	798,310	6–3½ K.S.	4	5 K.S.	12 H.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·1 *t*	900 / 2000	829
t.	Wisconsin .	11,653	368	72¼	26	12,452	S. Francisco.	1898	1901	549,666	16½–4 H.S.	3–4	5¼ H.S.	..	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 6 *1-pr.*, 4 M., 2 l.	1	17·2 *t*	800 / 1310	583
b.	Wyoming .	26,000	554	93¼	28½	28,000 P. tur.	Philadelphia	1911	..	963,800	11–9 K.S.	..	..	8–6 K.S.	11 K.S.	8	12 *12-in.*, 21 *5-in.*, 4 *3-pr.*, 2 M., 2 l.	2 sub.	20·5	1650 / 2500	1115

Also the monitors Amphitrite, Miantonomoh, Monadnock, and Terror, 3990 tons, Tonopah (*ex* Nevada), 3714 tons, Talahasse (*ex* Florida) and Ozark (*ex* Arkansas), 3235 tons, Cheyenne (*ex* Wyoming), 3218 tons, and the second-class battleship Texas, 6315 tons.

* See note on **page 239**. † Mean draught. ‡ Including armour, but not armament.

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.*	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	Albany . shd.	3487	345	43¾	20	7500	Elswick .	1899	1900	247,611	3	3–1¼ shields	10 *5-in.*, 10 *3-pr.*, 12 *1-pr.*, 2 M., 1 l.	..	20·5 *t*	512 747	356
scout .	Birmingham .	3750	420	46¾	17	15,670 Express	Quincy, Mass.	1907	1908	301,000	2–1½	..	2 *5-in.*, 6 *3-in.* . . .	2 sub.	24·3 *t*	1250	356
cr. .	Chattanooga shd..	3200	292	44	16¾	5303 B.&W.	Elizabeth Port	1903	1904	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·65 *t*	470 700	302
scout .	Chester . .	3750	420	46¾	17	16,000 Nor. turb.	Bath, Me. .	1907	1908	337,000	2–1½	..	2 *5-in.*, 6 *3-in.* . . .	2 sub.	26·5 *t*	1250	356
,, ,,	Cincinnati . .	3213	300	42	20¼	8,490 B.&W.	Brooklyn .	1892	1894	226,055	2½	4	11 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 2 M.	..	19·0	350 468	314
cr. .	Cleveland . shd..	3200	292	44	16¾	4640 B.&W.	Bath, Me. .	1901	1903	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·4 *t*	470 700	302
2nd cl. *cr.*	Columbia . .	7375	412	58¼	25½	18,509	Philadelphia	1892	1894	559,950	4–2½	4 shield	1 *8-in.*, 2 *6-in.*, 8 *4-in.*, 12 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	22·8 *t*	750 1670	477
3rd cl. *cr.* ,,	Denver . } Des Moines } shd.	3200	292	44	16¾	4135 B. & W.	{Philadelphia / Quincy, Mass.}	1902	1904	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·75	470 700	303
,,	Dubuque . .	1085	174	35	13	1193 B. & W.	Morris Heights, N.Y.	1904	1905	..	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 2 M.	..	12·9	200	162
cr.	Galveston . shd.	3200	292	44	16¾	5073 B. & W.	Richmond, Va.	1903	1904	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·4	470 700	302
g.r.	Helena . .	1392	250¾	40	10	1988	Newport News	1896	1897	57,536	½	2¼	8 *4-in.*, 4 *6-pr.*, 4 *1-pr.*, 2 M.	..	15·5 *t*	100 300	256
g.b.	Marietta . .	1000	174	34	13½	1054 B.&W.	S. Francisco.	1896	1897	45,823	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	13·2 *t*	100 239	140

* Prices exclusive of armament.

UNITED STATES.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
2nd cl. *cr.*	**Minneapolis**	7375	412	$58\frac{1}{4}$	$25\frac{1}{2}$	20,862	Philadelphia	1893	1894	552,754	$4–2\frac{1}{2}$	4 shield	1 *8-in.*, 2 *6-in.*, 8 *4-in.*, 12 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	23·0 *t*	750 / 1200	477
g.v.	**Nashville**	1371	220	38	12	2536 C. & Y.	Newport News	1895	1897	57,536	$\frac{1}{2}$	..	8 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 2 M.	..	16·7 *t*	150 / 400	176
3rd cl. *cr.*	**New Orleans** shd.	3487	346	$43\frac{3}{4}$	$19\frac{3}{4}$	7500	Elswick	1896	1898	293,684	..	$3–1\frac{1}{4}$ shields	10 *5-in.*, 10 *3-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	20·0	512 / 767	366
g.v.	**Paducah**	1085	174	35	13	1000 B.&W.	Morris Heights, N.Y.	1904	1905	..	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 2 M.	..	12·0	200	162
g.b.	**Princeton**	1000	168	36	$12\frac{1}{2}$	923	Camden	1897	1898	47,262	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·0	100 / 238	135
3rd cl. *cr.*	**Raleigh**	3213	300	42	$20\frac{1}{4}$	8500 B.&W.	Norfolk	1892	1894	226,055	$2\frac{1}{2}$	4	11 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	19·0	350 / 460	313
scout	**Salem**	3750	420	$46\frac{3}{4}$	$18\frac{1}{4}$	22,242 W.T. turb.	Quincy, Mass.	1907	1908	301,000	$2–1\frac{1}{2}$	..	2 *5-in.*, 6 *3-in.*	2 sub.	25·9 *t*	1250	356
3rd cl. *cr.*	**Tacoma** shd.	3200	292	44	$16\frac{3}{4}$	5288 B.&W.	S. Francisco.	1903	1904	212,325	..	2 shields	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·6 *t*	470 / 700	302
g.v.	**Vicksburg**	1000	168	36	$12\frac{1}{2}$	1118	Bath, Me.	1896	1898	47,406	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·7 *t*	100 / 239	135
,,	**Wheeling**	1000	174	34	$12\frac{1}{2}$	1080	S. Francisco.	1897	1897	65,540	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·9 *t*	120 / 226	140
,,	**Wilmington**	1392	$250\frac{3}{4}$	40	10	1894	Newport News	1895	1897	57,536	1	$2\frac{1}{4}$	8 *4-in.*, 4 *6-pr.*, 4 *1-pr.*, 4 M.	..	15·0 *t*	100 / 300	175

Third class cruisers Baltimore, Atalanta, Newark, and San Francisco, the last named converted into a mine-layer. Colliers Prometheus and Vestal (12,585 tons). Two other colliers are to be built. A gunboat, to be named Sacramento, was authorised in 1911. Torpedo depôt Castine, 1177 tons.
Training ships, Olympia, 5870 tons; Chicago, 4500 tons; Marblehead, 2089 tons. Torpedo experimental vessel, Montgomery, 2089 tons.
The Buffalo, Panther, Dixie, and Prairie are converted merchant vessels (3380 to 6625 tons), built 1889–93, armed with 6-in. and smaller guns.
The ocean liners St. Louis and St. Paul, 11,629 tons, New York and Philadelphia, 10,802 tons, 20 knots (International Navigation Co.), and the Korea and Siberia, 11,200 tons, 18 knots (Pacific Mail Steamship Co.) are enrolled auxiliary cruisers of the United States Navy.

* Prices exclusive of armament.

SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LESSER IMPORTANCE.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's yacht. Two armoured gunboats for the Danube built at Leghorn. The Nadiezda, despatch vessel (715 tons), launched Bordeaux, 1898; 18·85 knots; 2600 I.H.P.; Lagrafel-d'Allest boilers; armament, 2 3·9-in., 3 1·8-in. Q.F., and 2 torpedo tubes. Three 100-ton 26-knot torpedo boats launched 1907; three smaller.

Colombia.—The cruiser Almirante Lezo (*ex* El Baschir), of 1200 tons displacement; 2500 H.P.; 18 knots; built 1892, bought from Morocco, 1902. Two gunboats, Chercuito, 643 tons, and Bogota. Two river gunboats, General Nerino and Esperanza, 400 tons.

Cuba.—Cruiser Cuba, 2055 tons, 3500 H.P., 18 knots, and gunboat Patria, 1200 tons, 1500 H.P., 16 knots.

Ecuador.—The torpedo cruiser Almirante Simpson, 812 tons, bought from Chili. One torpedo boat and two transport vessels.

Egypt.—The Nile stern-wheel gunboats Sultan, Sheikh and Melik, 140 tons, Fateh and Naseh, 128 tons; also the Abu Klea, Hafir, Metemmeh, and Tamai.

Hayti.—Steel gunboat—Capois la Mort, 260 tons, 1 3·9-in., and 4 1-pr. Q.F. Iron corvette—Dessalines, 1200 tons, armed with 1 3·9-in. Q.F., 2 3·9-in. B.L., 2 l., 2 M. Two sloops—St. Michael and 1804. Gun-vessel, 22nd of December. The gunboat Liberté was blown up and destroyed, with a loss of 70 lives. It is stated that the Italian cruiser Umbria, 2245 tons, has been bought.

Mexico.—Two gun-vessels, Tampico and Vera Cruz, launched Elizabethport, New Jersey, 1902; displacement, 980 tons; armament, 4 4-in. Q.F., 6 6-pr.; bow torpedo tube; 2400 I.H.P.; speed, 16 knots; fitted to serve as transport for 200 troops. Gun vessels Bravo and Morero, 1200 tons; 2600 I.H.P.; Blechynden boilers; 17 knots; launched Leghorn, 1904. The Zaragoza, 1200 tons, 1300 H.P., 15 knots speed, and armed with 4 4·7-in. guns and 4 small quick-firing guns. Gun-vessel, Democrata, 450 tons; 11 knots; 2 6½-in. muzzle-loaders and 2 small guns. Torpedo transport General Guerrero, 1880 tons; 1200 I.H.P.; completed at Barrow 1908. Two small gunboats of 10 knots speed. Five torpedo boats. Two cruisers, 2400 tons, to be built.

Peru.—Almirante Grau, cruiser, 3200 tons; 370 ft. long, 40 ft. 6 in. beam, 14 ft. 3 in. draught; launched at Barrow, March, 1906;

2 6-in., 8 14-pr., 8 $1\frac{1}{4}$-pr.; 2 submerged torpedo tubes; $1\frac{1}{2}$-in. armoured deck, 3-in. conning tower; 14,000 I.H.P.; 24 knots. A sister vessel is in hand at the same yard. Eclaireur, cruiser, 1769 tons, launched 1877, partially reconstructed; bought from France. Armoured cruiser Dupuy de Lôme, purchased for £140,000, and renamed Elias Aquirre. Seven submarines are to be built in the United States. Lima, of 1700 tons, 1800 I.H.P., 16 knots; armament, 2 6-in. B.L.R. guns. Screw steamer, Santa Rosa, about 400 tons.

Roumania.—Elizabeta, protected cruiser (deck 3 in.), built in 1887 at Elswick; 230 ft. long, 32 ft. 10 in. beam; 1320 tons; 3000 I.H.P.; armament, 4 5·9-in. B.L.R., 4 Q.F., 2 M., 4 torpedo tubes. Composite gunboat Mircea, 360 tons; Grivitza, 110 tons. Two gunboats of 45 tons, and 3 first-class torpedo-boats, these forming the sea division. For the Danube, the gunboats Fulgurul, Oltul, Siretul, Bistritza, 90 to 100 tons, the *torpilleur de barrage* Alexandru cel Bun (104 tons), 5 sloops, 2 small torpedo boats. The shipbuilding programme includes 8 monitors of 600 tons, 12 torpedo-boats and 8 vedettes for the Danube, and 6 coast-defence vessels of 3500 tons, 4 destroyers of 300 tons, and 12 torpedo-boats for the Black Sea. Four monitors (3 4·7-in. guns) and 3 torpedo-boats completed.

Santo Domingo.—The Independencia, built in England 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns. Restauracion, steel gun-vessel, 1000 tons, launched at Glasgow in 1896. The 14-knot cruiser Presidente has been reconstructed, and carries seven guns.

Sarawak.—Two gunboats, of 175 and 118 tons respectively, of low speed, each armed with two guns.

Siam.—Deck-protected cruiser, Maha Chakrkri, 290 ft. long, 39 ft. 4 in. beam, of 2500 tons displacement and 17 to 18 knots speed; armament, four 4·7-in., and ten 6-pr. quick-firing guns. Makut-Rajakamar, 650 tons. The gunboats Bali, Muratha, and Sugrib, 600 tons, one 4·7-in. Q.F., five 2·2 in., four 1·4 in., 12 knots, launched 1898 and 1901. Several other gunboats. Three modern despatch vessels 100 to 250 tons. Three 380-ton, 27-knot destroyers, built at Kobe.

Uruguay.—Gunboats: General Artigas, 274 tons, $12\frac{1}{2}$ knots speed, 2 4·7-in. (Krupp), 2 M.; and General Saurez, 300 tons. The Italian cruiser Dogali has been purchased. The cruiser Uruguay, built at the Vulcan Yard, Stettin; 1100 tons; 2 4·7-in., 4 12-pr., 12 Maxims; 2 18-in. torpedo tubes; 5700 I.H.P.; 23 knots.

Venezuela.—The gunboats Bolivar (571 tons, 18·6 knots) and Miranda (200 tons, 12 knots); transports Restaurador (568 tons), and Zamora (350 tons).

BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

Great Britain.

Name or Number.	Built by.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain. TORPEDO-BOAT DESTROYERS.			Feet	Feet.	Feet.		Tons.		Knots.				Tons.
†Boxer	Thornycroft	1894	201·6	19	7·3	2	265	4,500	29·17	1-12 pr. 5-6 prs.	2	45	60
†Bruizer	„	1895	201·6	19	7·3	2	265	4,500	27·97	1-12 pr. 5-6 prs.	1	45	60
Conflict	White	1894	205·6	20	..	2	320	4,370	27·21	1-12 pr. 5-6 prs.	2	50	60
Dragon	Laird	1894	210	19·5	..	2	290	4,500	27·14	1-12 pr. 3-6 prs.	1	50	60
Fervent	Hanna	1895	200	19	7·8	2	275	3,800	[27]	1-12 pr. 5-6 prs.	1	50	70
†Handy	Fairfield	1895	200	19	7·8	2	275	3,800	27·04	1-12 pr. 5-6 prs.	1	50	70
*Hasty	Yarrow	1894	190	18·5	5·25	2	270	3,250	26·08	1-12 pr. 5-6 prs.	2	45	60
Lightning	Palmer	1895	200	19·7	6·5	2	275	4,007	27·94	1-12 pr. 5-6 prs.	2	50	60
Opossum	Hawthorn	1895	200	19	5·2	2	295	4,052	28·24	1-12 pr. 5-6 prs.	1	50	60
Porcupine	Palmer	1895	200	19·7	6·5	2	275	3,866	27·91	1-12 pr. 5-6 prs.	2	50	60
Ranger	Hawthorn	1895	200	19	5·2	2	295	3,900	27·13	1-12 pr. 5-6 prs.	1	50	60
Sunfish	Hawthorn	1895	200	19	5·2	2	295	4,292	27·62	1-12 pr. 5-6 prs.	1	50	60
Surly	Thomson	1894	205·6	19·5	5·25	2	280	4,400	28·05	1-12 pr. 5-6 prs.	2	50	50
Teazer	White	1895	200	19·5	5·6	2	320	4,500	[27]	1-12 pr. 5-6 prs.	2	50	60
Wizard	„	1895	200	19·5	5·2	2	320	4,400	[27]	1-12 pr. 5-6 prs.	2	45	60
Zebra	Thames Ironworks	1895	200	20	6	2	310	3,850	27·00	1-12 pr. 5-6 prs.	2	50	60
Zephyr	Hanna	1895	200	19	5·3	2	275	3,850	[27]	1-12 pr. 5-6 prs.	1	50	60
†Albatross	Thornycroft	1898	227·6	21·25	8·5	2	430	7,900	31·5	1-12 pr. 5-6 prs.	2	68	100
†Angler	„	1897	210	19·6	7·1	2	310	5,800	30·37	1-12 pr. 5-6 prs.	2	60	80
Arab	Brown & Co.	1901	218	20·0	5·6	2	470	6,000	31	1-12 pr. 5-6 prs.	2	60	80
†Avon	Vickers	1896	210·6	21·6	5·6	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Bat	Palmer	1896	215	20·75	6·8	2	360	6,185	30·1	1-12 pr. 5-6 prs.	2	60	91
†Bittern	Vickers	1897	210·6	21·6	5·6	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Brazen	Brown & Co.	1896	218	20·0	5·6	2	345	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Bullfinch	Earle's Co.	1898	210	20·6	5·8	2	345	5,800	30	1-12 pr. 5-6 prs.	2	60	80
†Cheerful	Hawthorn	1897	210	21·0	8	2	355	6,000	30	1-12 pr. 5-6 prs.	2	62	82
†Coquette	Thornycroft	1897	210	19·5	7·2	2	335	5,800	30·21	1-12 pr. 5-6 prs.	2	60	80
Crane	Palmer	1896	215	20·7	6·8	2	360	6,336	30·3	1-12 pr. 5-6 prs.	2	60	80
†Cygnet	Thornycroft	1898	210	19·5	7·2	2	335	5,800	30·3	1-12 pr. 5-6 prs.	2	60	80
†Cynthia	„	1898	210	19·5	7·2	2	355	5,800	30·2	1-12 pr. 5-6 prs.	2	60	80
†Desperate	„	1896	210	19·6	7·2	2	310	5,800	30	1-12 pr. 5-6 prs.	2	60	80
†Dove	Earle's Co.	1898	210·0	20·6	5·8	2	345	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Earnest	Laird	1896	210·6	21·7	5·3	2	355	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
Electra	Brown & Co.	1896	218	20·0	5·6	2	3 0	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Express	Laird	1897	227 6	22·0	9	2	465	9,000	31	1-12 pr. 5-6 prs.	2	60	80
Fairy	Fairfield	1897	227·6	22·0	9	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Falcon	„	1899	220	21·3	9	2	375	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Fame	Thornycroft	1896	210·6	19·6	7·1	2	310	5,800	30·16	1-12 pr. 5-6 prs.	2	60	80
Fawn	Palmer	1897	215	20·7	6·8	2	360	6,581	30·5	1-12 pr. 5-6 prs.	2	60	91
Flirt	„	1897	215	20·7	6·8	2	360	6,682	30	1-12 pr. 5-6 prs.	2	60	91
Flying Fish	„	1897	215	20·7	6·8	2	360	6,416	30·4	1-12 pr. 5-6 prs.	2	58	91
†Foam	Thornycroft	1896	210	19·6	7·1	2	310	5,800	30·18	1-12 pr. 5-6 prs.	2	58	80
Gipsy	Fairfield	1897	227·6	22·0	9	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Greyhound	Hawthorn	1900	210	21	8·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Griffon	Laird	1896	210·0	20	5·3	2	355	6,000	30·11	1-12 pr. 5-6 prs.	2	58	80
Kestrel	Brown & Co.	1898	218	20·0	5·6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Kangaroo	Palmer	1900	215	20·75	6·8	2	370	6,500	30	1-12 pr. 5-6 prs.	2	60	91
Leopard	Vickers	1897	210	20·0	5·6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Leven	Fairfield	1898	218 0	20·0	5·6	2	370	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Lively	Laird	1900	218	20·0	5·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Locust	„	1896	210	21·7	5·3	2	355	6,000	30·16	1-12 pr. 5-6 prs.	2	58	80
†Mallard	Thornycroft	1896	210·6	19·6	7·1	2	310	5,800	30·11	1-12 pr. 5-6 prs.	2	60	80
Mermaid	Hawthorn	1898	210	21 0	8	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	82
Myrmidon	Palmer	1900	215	20·75	6·8	2	370	6,500	30	1-12 pr. 5-6 prs.	2	62	91
Orwell	Laird	1898	218·0	20·0	5·6	2	360	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Osprey	Fairfield	1897	227·6	22·0	9	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Ostrich	„	1900	210	21·0	9	2	375	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Otter	Vickers	1896	210	20·0	5·6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Panther	Laird	1897	210·6	21·7	5·3	2	355	6,000	30·14	1-12 pr. 5-6 prs.	2	58	80
Peterel	Palmer	1899	215	20·8	..	2	370	6,200	30	1-12 pr. 5-6 prs.	2	62	85
Quail	Laird	1895	213 0	21·6	5·3	2	355	6,000	30·38	1-12 pr. 5-6 prs.	2	58	90
Racehorse	Hawthorn	1900	210	21	8 6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Recruit	Brown & Co.	1896	218·0	20·0	5 6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	58	90

* Built by Yarrow, fitted with Thornycroft W.T. boilers at Earle's. All Jarrow-built destroyers have Reed's boilers
† Thornycroft W.T. boilers

Great Britain—*continued.*

Name or Number.	Built by.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO-BOAT DESTROYERS.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Roebuck	Hawthorn	1901	210	21	8·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Seal	Laird	1897	218·0	20·0	5·6	2	355	6,000	30·15	1-12 pr. 5-6 prs.	2	58	80
Spiteful	Palmer	1899	215	20·75	6·8	2	365	6,500	30·1	1-12 pr. 5-6 prs.	2	62	91
Sprightly	Laird	1900	218	20·0	5·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	58	80
†Stag	Thornycroft	1900	210	19·75	7·2	2	320	5,800	30 34	1-12 pr. 5-6 prs.	2	60	80
Star	Palmer	1896	215	20·75	6·88	2	360	6,266	30·7	1-12 pr. 5-6 prs.	2	58	91
Success	Doxford	1901	210·0	21·0	9·2¾	2	380	6,000	30	1-12 pr. 5-6 prs.	2	62	43
†Sylvia	,,	1897	210	19·9	7·6	2	350	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Syren	Palmer	1900	215	20·75	6·8	2	390	6,500	30	1-12 pr. 5-6 prs.	2	..	91
Taku	Schichau	1898	193·6	20	5	2	305	6,500	32	6-3 pr. Q.	3	..	67
Thorn	Brown & Co.	1900	210	21	5·5	2	380	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Thrasher	Laird	1895	210·6	21·7	5·3	2	355	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
Vigilant	Brown & Co.	1900	210	21	5·5	2	380	6,000	30	1-12 pr. 5-6 prs.	2	58	80
†Violet	Doxford	1897	210	20·75	6·88	2	350	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Virago	Laird	1895	210·6	21·7	5·3	2	355	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
*a*Vixen	Vickers	1900	210·0	20·0	5·8	2	400	6,000	30	1-12 pr. 5-6 prs.	2	62	88
Vulture	Brown & Co.	1898	218	20	5·6	2	345	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Whiting	Palmer	1896	215	20·75	6·88	2	360	6,239	30·2	1-12 pr. 5 6 prs.	2	58	91
Wolf	Laird	1897	218	20	5·6	2	355	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Derwent	Hawthorn	1904	220	23	10	2	534	7,000	25·68	4-12 prs.	2	70	130
‡Eden	,,	1903	220	23	8¾	6	527	7,000	26·22	4-12 prs.	2	70	130
Exe	Palmer	,,	225	23½	10	2	540	7,000	25·64	4-12 prs.	2	70	127
Ribble	Yarrow	1904	225	23½	10	2	550	7,500	26	4-12 prs.	2	70	120
Itchen	Laird	1903	225	23½	10	2	550	7,000	25·64	4-12 prs.	2	70	130
Usk	Yarrow	,,	225	23½	10	2	550	7,500	26	4-12 prs.	2	70	120
Teviot	Yarrow	,,	225	23½	10	2	550	7,500	26	4-12 prs.	2	70	120
Ettrick	Palmer	,,	225	23½	10	2	540	7,000	25·56	4-12 prs.	2	70	127
Foyle	Laird	,,	225	23½	10	2	550	7,000	25·65	4-12 prs.	2	70	120
Erne	Palmer	,,	225	23½	10	2	540	7,000	25·6	4-12 prs.	2	70	127
Arun	Laird	,,	225	23½	10	2	550	7,000	25·72	4-12 prs.	2	70	130
Cherwell	Palmer	,,	225	23½	10	2	540	7,000	25·6	4-12 prs.	2	70	127
Dee	Palmer	,,	225	23½	10	2	540	7,000	25·5	4-12 prs.	2	70	127
Jed	Thornycroft	1904	222	23½	9·6	2	640	7,500	25·78	4-12 prs.	2	70	126
Kennet	,,	1903	222	23½	9·6	2	640	7,500	25·99	4-12 prs.	2	70	126
‡Velox	Parsons	1902	210	23	8½	8	440	8,000	27	1-12 pr. 5-6 prs.	2	63	130
Waveney	Hawthorn	1903	220	23½	10	2	534	7,000	25·62	4-12 prs.	2	70	130
Welland	Yarrow	1904	225	23½	10	2	550	7,500	26	4-12 prs.	2	70	120
Chelmer	Thornycroft	1904	222	23½	9·6	2	600	7,500	25·7	4-12 prs.	2	72	95 / 126
Boyne	Hawthorn	1904	222	23½	9·6	2	600	7,500	25·72	4-12 prs.	2	72	95 / 126
Colne	Thornycroft	1905	222	23½	9·6	2	600	7,500	25·57	4-12 prs.	2	72	95 / 126
Doon	Hawthorn	1904	222	23½	9·6	2	600	7,500	25·8	4-12 prs.	2	72	95 / 126
Garry	Yarrow	1905	222	23½	9·6	2	600	7,500	26·5	4-12 prs.	2	72	95 / 126
Kale	Hawthorn	1904	222	23½	9·6	2	600	7,500	25·74	4-12 prs.	2	72	95 / 126
Rother	Palmer	1904	222	23½	9·6	2	600	7,500	25·51	4-12 prs.	2	72	95 / 126
Liffey	Laird	1904	222	23½	9·6	2	600	7,500	25·51	4-12 prs.	2	72	95 / 126
Moy	,,	1904	222	23½	9·6	2	600	7,500	25·6	4-12 prs.	2	72	95 / 126
Ness	White	1905	222	23½	9·6	2	600	7,500	25·62	4-12 prs.	2	72	95 / 126
Nith	,,	1905	222	23½	9·6	2	600	7,500	25·69	4-12 prs.	2	72	95 / 126
Ouse	Laird	1905	222	23½	9·6	2	600	7,500	25·56	4-12 prs.	2	72	95 / 126
Swale	Palmer	1905	222	23½	9·6	2	600	7,500	25·59	4-12 prs.	2	72	95 / 126
Ure	Palmer	1904	222	23½	9·6	2	600	7,500	25·65	4-12 prs.	2	72	95 / 126
Wear	Palmer	1905	222	23½	9·6	2	600	7,500	25 62	4-12 prs.	2	72	95 / 126

† Thornycroft W.T. boilers. ‡ Hulls and Yarrow boilers of these vessels by Hawthorn Leslie & Co.
a Has four Express W.T. boilers.

Great Britain—*continued.*

Name or Number.	Built by.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal or Oil.
OCEAN-GOING DESTROYERS.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
‡*Afridi	Armstrong	1907	250	25	8·5	3	855	14,250	32·75				92¼e
‡*Cossack	Cammell Laird	1907	270	26	9·3	3	890	14,000	33·15	5–12-prs.	2	60	78
‡*Ghurka	Hawthorn	1907	255	25·7	9·3	3	880	14,250	34				98
¶*Mohawk	White	1907	270	25	8·10	3	865	14,500	34·51				74
†*Tartar	Thornycroft	1907	270	26	9·1	3	872	14,500	35·67	3-12 prs.	2	68	76
¶*Saracen	White	1908	272	26	9·5	3	980	15,500	33·8	2·4-in. B.L.	2	67	84e
†*Amazon	Thornycroft	1908	280	26½	9·2	3	970		33·73				86e
¶*Crusader	White	1909	280	26	9·8	3	1045	15,500	35				99e
‡*Maori	Denny	1909	280	27	8·8	3	1035	15,500	33				103e
†*Nubian	Thornycroft	1909	280	26½	9·1	3	985	15,500	34·88	2·4-in. B.L.	2	71	97½e
‡*Viking	Palmer	1909	280	27·3	8·7	3	1000	15,500	..				102½e
‡*Zulu	Hawthorn	1909	280	27	8·9	3	1000	15,500	34				94e
§Albacore §Bonetta	Palmer *b*	1908	215	21	7	..	440	7,000	26·75	3–12 prs.	2	43½	..
¶§Basilisk	White	1910	275	28			935		27·98				
‡§Beagle	John Brown	1909	269	26·7			860		27·12				
‡§Bulldog	,,	1909	269	26·7			860		27·4				
‡§Foxhound	,,	1909	269	26·7			860		27·7				
‡§Grasshopper	Fairfield	1909	271	27¼			890		27·04				
¶§Harpy	White	1909	275	28			935		27·75				
‡§Mosquito	Fairfield	1910	271	27¾	8·6	3	890	12,500	27·12	1·4-in., 3-12 prs.	2	96	120e
‡§Nautilus	Thames Ironworks	1910	267½	28			1050		28·1				
‡§Pincher	Denny	1910	271¾	28½			940		27·17				
‡§Racoon	Cammell Laird	1910	266	28			920		27·07				
‡§Rattlesnake	Lond. & Glasgow Co.	1910	270¼	27½			900		27·03				
‡§Renard	Cammell Laird	1909	266	28			920		27·14				
‡§Savage	Thornycroft	1910	264	28	9·3	3	885		27·16				
‡§Scorpion	Fairfield	1910	271	27·9	..	3	890	12,500	27·1	1·4-in., 3–12 prs.	2	96	..
‡§Scourge	Hawthorn	1910	266¾	28	8·6	3	925		27·06				
‡§Wolverine	Cammell Laird	1910	266	28	..	3	920		27·1				
‡§Stour ‡§Test	Cammell Laird *c*	1909	220	23·9	7·11	..	566	7,000	25·58 25·62	4-12-prs.	2	..	66½
‡*Acorn		1910							27·22				
‡*Alarm	John Brown	1910							*d*				
‡*Brisk		1910							*d*				
‡*Cameleon		1910							28·03				
‡*Comet	Fairfield	1910							27·09				
‡*Goldfinch		1910							*d*				
‡*Fury	Inglis	1911							*d*				
‡*Hope	Swan, Hunter	1910							*d*				
‡*Larne		1910							28·72				
‡*Lyra		1910							28·88				
‡*Martin	Thornycroft	1910	240	25·6	7·10	3	780	13,500	*d*	2·4-in. B.L., 2-12-prs.	2	72	85e
‡*Minstrel		1911							*d*				
‡*Nemesis		1910							*d*				
‡*Nereide	Hawthorn	1910							*d*				
‡*Nymphe		1911							*d*				
¶*Redpole		1910							29·14				
¶*Rifleman	White	1910							29·3				
¶*Ruby		1910							30·23				
‡*Sheldrake ‡*Staunch	Denny	1911 1910							*d* *d*				
‡*Acheron ‡*Ariel	Thornycroft	1911 1911	251¾	26·4	8	2	780	13,500	30·4	2 4-in. Q.F., 2 12-prs.	2	72	..
‡*Archer ‡*Attack	Yarrow	1911 1911	251¾	26·4	8	2	780	13,500	30·9	2 4-in. Q.F., 2 12-prs.	2	72	..
‡*Badger ‡*Beaver	Parsons	1911 1911	251¾	26·4	8	2	780	13,550	30	2 4-in. Q.F., 2 12-prs.	2	72	..
‡*Defender ‡*Druid	Denny	1911 1911											
¶*Ferret ¶*Forester	White	1911 1911											
‡*Goshawk	Beardmore	1911											
‡*Hind		1911											
‡*Hornet	John Brown	1911	240	25¾	7·10	3	780	13,500	27	2 4-in. Q.F., 2 12-prs.	2	72	174
‡*Hydra		Bldg.											
‡*Jackal ‡*Tigress	Hawthorn	1911 1911											
‡*Lapwing ‡*Lizard	Cammell Laird	1911 1911											
‡*Phoenix	Vickers	1911											
‡*Sandfly	Swan, Hunter	1911											
‡*Firedrake ‡*Lurcher ‡*Oak	Yarrow	Bldg.	255	25·7	..	2	780	..	32	2 4-in. Q.F., 2 12-prs.	2	72	174

* Fitted with turbines and for using oil fuel. † Have Thornycroft W.T. boilers. ‡ Fitted with modified Yarrow W.T. boilers.
§ Fitted with turbines and for using coal. ¶ Fitted with White-Forster boilers.
b Purchased after completion, March, 1909, to replace Tiger and Gala.
c Purchased after completion, December, 1909, to replace Blackwater and Lee. *d* Designed speed, 27 knots; trial speed not published.
e Estimated.

Great Britain—*continued.*

Name or Number.	Built by.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal or Oil.
OCEAN-GOING DESTROYERS—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
‡*Acasta ‡*Achates ‡*Ambuscade	John Brown	Bldg.	260	27	8·3	3	935	24,500	32	3 4-in.	2	100	..
‡*Ardent	Denny	Bldg.	257	26½	8·0	2	..	..	31	3 4-in.	2	100	..
‡*Christopher ‡*Cockatrice ‡*Contest	Hawthorn	Bldg.	260	27	8·3	3	935	24,500	32	3 4-in.	2	100	..
‡*Fortune	Fairfield	Bldg.	257	26½	8·0	2	..	..	31	3 4-in.	2	100	..
‡*Garland	Parsons:	Bldg.	257	26½	8·0	2	..	..	31	3 4-in.	2	100	..
‡*Hardy (*a*)	Thornycroft	Bldg.	257	26½	8·0	..	..	..	32	3 4-in.	2	100	..
‡*Lynx ‡*Midge ‡*Owl	London and Glasgow Co.	Bldg.	260	27	8·0	3	935	24,500	32	3 4-in.	2	100	..
‡*Paragon ‡*Porpoise ‡*Unity ‡*Victor ‡*Shark	Thornycroft	Bldg.	257	26½	8·0	2	..	..	31	3 4-in.	2	100	..
‡*Sparrowhawk ‡*Spitfire	Swan Hunter	Bldg.	260	27	8·3	3	935	24,500	32	3 4 in.	2	100	..
20 boats (programme 1912-13)	..	..	..	..	..	..	..	..	..	..	..	..	..
TORPEDO BOATS. FIRST CLASS—													
025–027 (3 boats)	Thornycroft	1886	127·5	12·5	6·2	1	60	600	21	2-3 prs.	3	..	10
033	Yarrow	1886	125	13	5·5	1	66	670	19·5	2–3 prs.	5	15	20
034	White	1886	125	14·6	4	1	66	950	18–19	..	5	15	..
041, 042 (2 boats), 049–055 (7 boats), 057, 058 (2 boats)	Thornycroft	1886	127·5	12·5	6·2	1	60	700	21	2–3 prs.	4	15	..
065–068 (4 boats) 071–074 (4 boats) 076–078 (3 boats)	Yarrow	1886	125	13	5·5	1	75	700	19–20	2–3 prs.	5	15	20
079	,,	1886	125	13	5·5	..	75	1,000	22·4	2–3 prs.	..	15	20
80	,,	1887	135	14	6	1	105	1,540	23	4–3 prs.	5	21	30
81 (*ex*-Swift)	White	1885	150	17·5	..	1	125	..	..	6–3 prs.	3	25	35
82, 83 (2 boats)	Yarrow	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
85–87 (3 boats)	,,	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
88, 89 (2 boats)	,,	1894	142	14·75	4·5	1	·112	1,600	..	3–3 prs.	3	18	20
90	,,	1895	140	14·25	3·7	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Thornycroft	1894	140	15·5	7·5	1	130	2,400	23-24	3–3 prs.	3	18	25
93	,,	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
95, 96 (2 boats)	White	1894	140	15·5	..	1	130	2,000	23·2	3–3 prs.	3	18	25
97	Laird	1893	140	15·5	..	1	130	2,690	23·35	3–3 prs.	3	18	25
98, 99 (2 boats)	Thornycroft	1901	160	17	8·4	1	178	2,850	25	3–3 prs.	3	32	20
101	M'Arthur	1888	130·5	14	..	1	92	1,060	21	2–3 prs.	3	18	35
102, 103 (2 boats)	Thornycroft	1888	134·6	14·8	7·1	1	96	1,050	23·2	2-3 prs.	3	18	..
104–105 (2 boats)	White	1889	130	14·5	..	1	95	1,250	20	2–3 prs.	3	18	..
107, 108 (2 boats)	Thornycroft	1901	160	17	8·4	1	178	2,850	25	3–3 prs.	3	32	20
109-113 (5 boats)	,,	1902	166	17·25	8·4	1	200	2,900	25	3–3 prs.	3	32	42
114-117 (4 boats)	White	1903	165	17·6	8·8	1	205	2,900	25	3–3 prs.	3	32	28
*Pro. 1905–6: 5 boats (1–5)	¶White	1906	175	17½	5·8	3	235	3,750	26	2–12 prs.	3	35	20*f*
5 boats (6–10)†	¶Thornycroft	1906–7	166½	17½	6·3	3	255	3,750	27·3	2–12 prs.	3	35	
2 boats (11–12)‡	¶Yarrow	1907	172	18	5·3	3	225	3,750	26	2–12 prs.	3	35	
*Pro. 1906-7: 4 boats (13–16)	White	1907	182	18	5·10	3	256	4,000	26	2–12 prs.	3	..	23–5
2 boats (17–18)‡	Denny	1907	180	18	5·6	3	251	4,000	26	2–12 prs.	3	..	
2 boats (19–20)†	Thornycroft	1907–8	178·6	18·3	6.5	3	280	4,000	26	2–12 prs.	3	..	
2 boats (21–22)‡	Hawthorn	1907–8	185	18·6	6·6	3	308	4,000	26	2–12 prs.	3	..	
No. 23 ‡	Yarrow	1907	177·3	18	5·4	3	253	4,000	26	2–12 prs.	3	..	
No. 24 ‡	Palmer	1908	177	17·9	6·5	3	292	4,000	26	2–12 prs.	3	..	
*Pro. 1907–8: 4 boats (25–28)	White	1908	182	18	6·6	3	283	4,000	26	2–12 prs.	3	..	25
2 boats (29–30)‡	Denny	1908	180	18	5·3	3	259	4,000	26	2–12 prs.	3	..	25½
2 boats (31–32)†	Thornycroft	1908	178 6	18·75	6·2	3	287	4,000	26·5	2–12 prs.	3	33	24½
2 boats (33-34)‡	Hawthorn	1909	185	18·6	6·5	3	306	4,000	26	2–16 prs.	3	..	23½
3 boats (35–36)‡	Palmer	1909	177	17·9	6·6	3	298	4,000	26	2–12 prs.	3	33	24

* Fitted with turbines and for using oil fuel. † Have Thornycroft W.T. boilers. ‡ Fitted with modified Yarrow W.T. boilers.
¶ These boats were originally named, as shown in the *Naval Annual* for 1906–1907.
a Fitted with Diesel engines for cruising purposes. *f* 1000 knots.

Great Britain—*continued.*

Number.	Built by.	Launched.	Dimensions. Length.	Dimensions. Beam.	Number of Screws.	Submerged Displacement.	Indicated Horse-Power.	Speed. Surface.	Speed. Submerged.	Torpedo Tubes.	Complement.	Fuel.
SUBMARINES.			Feet.	Feet.		Tons.		Knots.	Knots.			Tons.
2 boats (Nos. A 2, A 4, 1902-3)	Vickers	1903	100	10	1	204	450	11	7	2	..	11
9 boats (Nos. A 5–A 13, 1903-4) ..	,, ...	1904	150	..	..	204	600	16	9	2	..	..
11 boats (B Class) ..	,, ...	1905	135	13½	..	313	600	13	9	..	..	15
10 boats (1905-6) C class	,, ...	1906-7	135	13½	..	313	600	14	10	2	..	15
5 boats (1906-7) C12–16	,, ...	1907-8	135	13½	..	313	600	13	..	2	..	15
1 boat (1906-7) D 1 ..	,, ...	1908	..	..	2	595	1,200	16	10	3	..	..
2 boats (1906-7) C 17 & C 18	Chatham	1908	135	13½	..	313	600	13	..	2	..	15
2 boats (1907-8) C 19–C 20..	Chatham	1909	135	13½	..	321	600	13	10	2	..	15
10 (1907-8)— C 21–C 24 .. .. C 25–C 30	Vickers	1908 1909	135	13¼	..	321	600	13	..	..	..	15
2 (1908-9) C 33–C 34 .	Chatham	1910	135	13¼	..	321	600	13	..	..	..	15
7 (1908-9)— C 31–C 32 .. .. C 35 C 36 .. .. C 37–C 38	Vickers .. .. ,, ... ,, ...	1909 1909 1910	135	13¼	..	321	600	13	..	..	..	15
D 2	,, ...	1910	..	..	..	..	..	..	..	..	..	..
2 (1909-10) D 7–D 8..	Chatham	1911	..	..	..	604	1200	..	..	..	..	..
4 (1909-10) D 3–D 6..	Vickers	1911	..	..	..	..	..	..	..	..	..	..
2 (1910-11) E 1–E 2..	Chatham	Bldg.	176	22½	..	800	..	15	..	..	..	..
4 (1910-11) E 3–E 6..	Vickers	Bldg.	176	22½	..	800	..	15	..	..	..	..
2 (1911-12) E 7–E 8..	Chatham	Bldg.	..	..	..	..	..	..	..	..	..	..
3 (1911-12) E 9–E 11.	Vickers	Bldg.	..	..	..	..	..	..	..	..	..	..
1 (1911-12), Special Laurenti type ..	Scotts'	Bldg.	..	..	..	..	..	..	..	..	..	..

TORPEDO FLOTILLAS OF THE DOMINIONS.

Australia.

Name or Number.	Built by.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO-BOAT DESTROYERS.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Yarra	Denny	1910	245¾	24¼	7·8	3	700	9,500	27	1 4-in., 3 12-pdr.	3	66	130
Parramatta	Fairfield	1910	245¾	24¼	7·8	3	700	9,500	28·48				
Warrego	Fairfield*	1911	245	24¼	7·8	3	700	9,500	28				
SUBMARINES.													
2 boats	Vickers	Bldg.	Details not published.			..	..	..	..	..	..	..	..

* Transported in sections and reconstructed in Australia.

Argentine Republic.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Corrientes	Yarrow ..	1896	190	19·6	7·4	2	280	4,000	27·4 t.	1 14-pr.	3	54	80
Missiones..	Yarrow ..	1896	190	19·6	7·4	2	280	4,000	26·0 t.	3 6-pr,	3	54	80
Entre Rios	Yarrow ..	1896	190	19·6	7·4	2	280	4,000	26·7 t.	Q.F., 2 M.	3	54	80
San Luis, Santa Fé, Santiago, Tucuman	Cammell ..	1911	285	29·9	9·6	..	980	19,750	32	4 4-in.	4	110	225*
Mendoza, Rioja, Salta, San Juan ..	Nantes ..	1911	283·2	28·3	9·9	..	950	18,000	32	4 4-in.	4	110	250*
Catamarca, Jujuy ..	Germania ..	1911	286·7	27·1	9·6	2	940	18,000	32	4 4-in.	4	110	250*
Cordoba, La Plata ..	Schichau ..	1911	279	29·6	7·3	..	890	19,000	34 7	4 4-in.	4	110	290*
FIRST CLASS—													
2 boats	Thornycroft	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Yarrow ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15

The two 150-ft. boats are named Comodoro Py and Murature.
The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne.
* Also oil fuel 50–110 tons. Birkenhead boats, combined impulse and reaction turbines; French, Rateau; German, German Admiralty type.

Austria-Hungary.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Six	Fiume.. ..	Bldg.	265·9	25·6	8·0	..	800	..	..	..	..	..	..
Huszar	Yarrow ..	1905											
Streiter	Trieste ..	1906											
Ulan		1906											
Wildfang		1906											
Uskoke		1907											
Scharfschütze		1907											
Dinara	Fiume ..	1908 1909	219·8	20·3	..	2	383	6,000	28·5	1 12-pr. 7 3-pr.	..	64	..
Ustkos													
Pandur													
Reka													
Turul													
Velebit													
FIRST CLASS—													
Kaiman	Yarrow ..	1905											
Alligator													
Anaconda													
Drache													
Delphin													
Greif													
Hai													
Krokodil	Trieste ..	1906–7											
Moewe													
Narwal													
Pinguin													
Schwalbe													
Seehund			179·9	18·0	8·6	1	197	3,000	26	4 3-pr.	..	25	..
Wal													
Triton													
Alk													
Echse													
Hydra													
Kormoran	Fiume ..	1910											
Krake													
Molk..													
Phönix													
Polyp													
Skorpion													
Boa													
Cobra	Yarrow ..	1898–9	152·6	15·3	7·6	1	133	2,000	24·3	2 3-pr.	3	24	30
Kigyo													
Python													
Viper	Yarrow ..	1896	147·6	14·9	7·6	1	130	2,000	26·5	2 3-pr.	2	26	30
Natter	Yarrow ..	1896	150	17·5	8·8	2	152	2,300	26·5	2 3-pr.	3	..	30
I—XII	Trieste and Fiume	1909 1910	142	14·4	5·0	..	200	2,600	26	2 3-pr.	2	..	..
SUBMERSIBLES—													
U 1 and 2	Pola	1908–9	100	9·8	..	..	216 240	720 200	12·2–7·3	..	3	..	..
U 3 and 4	Kiel, Germania	1908	141·8	12·6	..	2	235 295	600 320	12–9	..	2	17	..
U 5 and 6	Fiume.. ..	1909	105	21·0	..	..	235 268	500 230	11·4–10	..	2	..	..
U 7	Fiume.. ..												

About twenty torpedo-boats (83 tons), built 1890–92, are of doubtful value. Submarines U 8-U 13 are provided for by the Fleet Law, and will be put in hand in 1912 or 1913.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Para		1908						7,014	27·25				
Amazonas		1908						6,898	27·17				
Piahuy		1908						6,563	27·21				
Matto Grosso		1908						7,403	27·16				
Parahyba	Yarrow ..	1909	240	23·6	10	2	550	6,700	27·29	2 4-in., 4 3 prs.	2	..	140
Rio Grande do N. ..		1909						7,778	27·27				
Alagoas		1909						7,403	27·25				
Santa Catharina ..		1909						6,982	27·30				
Parana		1910						8,877	28·74				
Sergipe		1909						8,554	27·60				
FIRST CLASS—													
Pedro Ivo .. .. .. / Silvado	Elbing ..	1892–3	152	17·2	7·9	2	130	2,200	28	2–1 prs.	3	24	30
Goyaz	Yarrow ..	1907	152·5	15·3	..	3	..	..	26·5	2–3 prs.	2	..	..
Gonzales	Thornycroft	1908	152·5	15·3	..	3	..	..	26·5	2–3 prs.	2	..	..

Five additional destroyers and three large submarines are proposed.
Three submersibles are building at Muggiano (F.I.A.T.), Laurenti type.

Chile.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Six	White	Bldg.	320	32·6	11·1	3	1500	27,000	31	6–4-in. 2 M.	3	..	507
Capitan Orella ..	Laird	1896	210	21·6	5·4	2	300	6,000	30·17	1-12 pr. Q.F. 5-6 pr.	2	65	90
Capitan Munoz Gamero	Laird	1896	210	21·6	5·4	2	300	6,000	30·42	1-12 pr. Q.F. 5-6 pr.	2	65	90
Teniente Serrano ..	Laird	1896	210	21·6	5.4	2	300	6,000	30·35	1–12 pr. Q.F. 5-6 pr.	2	65	90
Guardia-Marina Riquelme	Laird	1896	210	21·6	5·4	2	300	6,000	30·09	1-12 pr. Q.F. 5-6 pr.	2	65	90
Capitan Merino Tarpa .. .. .. / Capitan O'Brien ..	Laird	1901	210	21·6	5·4	2	350	6,000	30	Do.	2	65	90
FIRST CLASS—													
Injeniero Hyatt, Cirujano Videla, Injeniero Mutilla, Guardia-Marina Contreras, Capitan Thompson, and Teniente Rodriguez (Viper type) ..	Yarrow ..	1896 / 1898	152·6	15·3	7·9	1	140	2,200	27·5-27·2	3-3 pr. Q.F.	3	28	40

The Thompson and Rodriguez were sent out in sections, and put together at Talcahuano and Valparaiso.

China.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
2 boats	Stettin ..	1897	123·5	21·7	..	..	120	..	20	2 1-pr.	3	20	15
4 boats	Kobe	1906-7	..	..	..	..	97	950	23	2 3-pr.	3	..	..
SECOND CLASS—													
1 boat	Foochow ..	1903	88·6	6·7	3·3	1	30	550	20·5				

A destroyer (400 tons) is in band at Elbing (Schichau), and another at the Stabilimento Tecnico, Trieste.

Denmark.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ormen	Copenhagen	1907	125	14·3	..	..	98	2,000	26	2 1-pr.	3	..	21
Hajen	Copenhagen	1896											
Havörnen	Copenhagen	1897	154·3	15·4	7·9	2	142	2,317	22·9	1 4·7-in. 1 1-pr.	3	..	..
Söbjörnen	Copenhagen	1898											
Delfinen	Thornycroft	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Havhesten	Thornycroft	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Thornycroft	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Thornycroft	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	2 1-pr. revs.	4	..	16
Sölöven	Thornycroft	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Söulven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stören	Thornycroft	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Thornycroft	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9

Destroyers (230 tons, 27 knots), built and building, as follows:—Flyvesfisken (Schichau); Sorldderen (Yarrow), 27·2 knots; Soulven, Spaekhuggeren (Copenhagen dockyard); Tumleren, Vindhunden (Burmeister and Wain).
Electric submersible Dikkeren, delivered by F.I.AT. Co., Muggiano, 1909.—Length, 114 ft. 3 in.; beam, 11 ft.; 103–130 tons, 12-7½ knots. Submersibles Havmanden and Havfruen, of the Holland type, are being built by the Whitehead company, one at Fiume, the other at Copenhagen dockyard.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Arbalète	Normand ..	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Arc	Châlon ..	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Arquebuse..	Normand ..	1902	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Baliste	Rouen ..	1903	183·9	20·11	10·3	2	300	6,000	29·4	1-9pr. 6-3prs.	2	62	75
Bélier	Nantes ..	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Bombarde	Havre (F.&C.)	1903	183·9	20·11	10·3	2	300	6,000	30·5	1-9pr. 6-3prs.	2	62	75
Bouclier	Normand ..	1910	233·8	24·9	9·7	3	715	15,000	31	2-3·9in.4-9pr.	4	62	160
Boutefeu	Bordeaux ..	1909	233·8	24·9	9·7	3	715	13,000	31	2-3·9in 4-9pr.	4	62	160
Branlebas	Normand ..	1907	193·9	21·3	10·3	2	320	5,000	28	1-9prs.6-3prs.	2	62	84
Carabine	Rochefort ..	1902	183·9	20·11	10·3	2	305	6,300	28	1-9pr. 6-3prs.	2	62	75
Carabinier	Rouen	1908	210·6	21·9	10·3	3	430	7,200	28	6–9 prs.	3	62	120
Carquois	Rochefort ..	1907	190·3	19·6	10·3	2	335	7,200	30	19-pr.4 3-prs.	2	62	37
Casque	Havre (F.&C.)	1909	233·8	24·9	9·7	3	715	13,000	31	2-3 9in.4-9pr.	4	62	160
Catapulte	Havre (F.&C.)	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Cavalier	Normand ..	1910	210·6	21·8	10·3	3	469	8,600	31·2	6–9 prs.	3	62	150
Chasseur	Normand ..	1909	210·6	21·9	10.3	3	454	7,200	28	6–9 prs.	3	62	120
Cimeterre	Bordeaux ..	1909	246·0	26	9·7	3	730	13,500	31	2-3·9in.4-9pr	4	62	160
Claymore	Normand ..	1906	190·3	20·11	10·3	2	335	6,000	30·3	1-9pr. 6-3prs.	2	62	75
Cognée	Toulon ..	1907	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Coutelas	Rochefort ..	1907	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Dague..	Bordeaux ..	1910	246·0	26	9·7	3	730	13,000	31	2-3·9in.4-9pr.	4	62	160
Dard	Rouen ..	1903	183·9	20·11	10·3	2	310	6,500	29·4	1-9pr. 6-3prs.	2	62	75
Durandal	Normand ..	1899	180·5	20·8	10·3	2	300	5,000	28	1-9pr. 6-3prs.	2	62	84
Epée	Havre (F.&C.)	1900	190·3	20·8	10·3	2	335	5,700	26	1-9pr. 6-3prs.	2	62	75
Epieu	Normand ..	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Escopette	Rochefort ..	1900	183·9	20·8	10·3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Etendard	Bordeaux ..	1908	210·6	21·9	10·3	3	430	6,000	28	1-9pr. 6-3prs.	3	..	..
Fanion..	Bordeaux ..	1908	210·6	21·9	10·3	3	430	6,000	28	1-9pr. 6-3prs.	3	..	..
Fanfare	Normand ..	1907	193·9	21·3	10·3	2	320	5,000	28	1-9pr. 6-3prs.	2	62	84
Fantassin	Havre (F.&C.)	1909	210·6	21·8	10·3	3	469	8,600	30·5	6–9 prs.	3	62	150
Fauconneau	Normand ..	1904	210·6	21·9	10·3	3	430	6,000	28	1-9pr. 6-3prs.	3	..	..
Faulx	Nantes ..	1911	233·8	24·9	9·7	3	715	13,000	31	2-3·9in.4-9pr.	4	62	160
Flamberge..	Rochefort ..	1901	183·9	20·8	10·3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Fleuret	Rochefort ..	1907	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Fourche	Nantes ..	1909	233·8	24·9	9.7	3	715	13,000	31	2-3·9in.4-9pr.	4	62	160
Francisque..	Rochefort ..	1904	183·9	20·11	16·3	2	305	6,300	28	1-9pr. 6-3prs.	2	62	75
Fronde	Bordeaux ..	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	65
Gabion	Rouen ..	1907	210·6	21·9	10·3	3	430	6,000	28	1-9pr. 6-3prs.	3	..	..
Glaive..	Rochefort ..	1908	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Hache	Toulon ..	1908	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Hallebarde	Normand ..	1899	180·5	20·8	10·3	2	305	5,300	27·2	1-9pr. 6-3prs.	2	62	84
Harpon	Bordeaux ..	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Hussard	Lorient ..	1909	210·6	21·9	10·3	3	430	7,200	28	6–9 prs.	3	62	120
Janissaire	Rouen.. ..	1910	210·6	21·8	10·3	3	469	8,600	28·5	6-9 prs.	3	62	150
Javeline	Nantes ..	1903	183·9	20·11	10·3	2	300	7,000	29·3	1-9pr. 6-3prs.	2	62	75
Lansquenet	Bordeaux ..	1909	210·6	21·8	10·3	3	469	8,600	28	6–9 prs.	3	62	150
Mameluck	Nantes ..	1909	210·6	21·8	10·3	3	469	8,600	28	6–9 prs.	3	62	150
Massue	Toulon ..	1908	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Mortier	Rochefort ..	1906	190·3	20·11	10·3	2	335	6,300	28	1-9pr. 6-3prs.	2	62	75

N.B.—"F. & C." "Forges et Chantiers." "Normand" means that the boat has been built at that firm's yard at Havre.

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*cont.*													
Mousquet	Nantes	1902	183·9	20·11	10·3	2	300	6,300	30·2	1-9pr. 6-3prs.	2	62	75
Mousqueton	Châlon	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Obusier	Rochefort	1907	190·3	20·11	10·3	2	335	6,300	28	1-9pr. 6-3prs.	2	62	75
Oriflamme	Nantes	1908	210·6	21·9	10·3	3	430	6,000	28	1-9pr. 6-3prs.	3	..	..
Pertuisane	Rochefort	1900	183·9	20·8	10.3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Pierrier	Rochefort	1906	190·3	20·11	10.3	2	335	6,300	28	1-9pr. 63-prs.	2	62	75
Pique	Havre (F.&C.)	1900	190·3	20·8	10.3	2	335	5,700	26	1-9pr. 6-3prs.	2	62	75
Pistolet	Nantes	1903	183·9	20·11	10.3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Poignard	Rochefort	1909	190·3	20·11	10.3	2	335	6,000	28	1-9pr. 6 3prs.	2	62	75
Rapière	Rochefort	1901	183·9	20·8	10·3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Sabre	Rochefort	1904	183·9	20·11	10·3	2	305	6,300	28	1-9pr. 6-3prs.	2	62	75
Sabretache	Nantes	1908	210·6	21·9	10·3	3	430	6,000	28	6–9 prs.	3	..	..
Sagaie	Havre (F.&C.)	1902	183·9	20·11	10·3	2	300	6,000	30·1	1-9pr. 6-3prs.	2	62	75
Sape	Rouen	1907	210·6	21·9	10·3	3	430	6,000	28	1-9pr. 6-3prs.	3	..	..
Sarbacane	Rochefort	1903	183·9	20·11	10·3	2	305	6,300	28	1-9pr 6-3prs.	2	62	75
Spahi	Havre	1908	210·6	21·9	10·3	3	430	7,200	28	6–9 prs.	3	62	120
Stylet	Rochefort	1905	190·3	20·11	10·3	2	335	6,300	..	1-9pr. 6-3prs.	2	62	75
Takou *	Elbing	1898	193·7	21·0	..	2	280	6,000	25	6–3 pr. Q.F.	2	62	67
Tirailleur	Bordeaux	1908	206·9	21·8	9·7	3	410	7,200	28	6-9 pr.	2	62	120
Tromblon	Rochefort	1905	190·3	21·0	10·3	2	335	6,300	25	6–3 pr. Q.F.	3	62	67
Trident	Rochefort	1907	190·3	19·6	10·3	2	335	7,200	30	1-9pr. 6-3prs.	2	62	37
Voltigeur	Nantes	1909	210·6	21·9	10·3	3	430	7,200	28	6–9 prs.	3	62	120
Yatagan	Nantes	1900	190·3	20·8	10·3	2	335	5,700	26	1-9pr. 6-3prs.	2	62	33
Bory, Garnier, Rivière, Mehl, Dehorter (5)	Normand, &c.	1911	243	24·9	10·0	3	740	18,000	31	2 3·9-in., 4 9 prs.	4	62	120
Bisson, Renaudin, Protet, Magon, Comm. Lucas, Mangini (6)	Toulon, etc.	Bldg.	243	24·9	10·0	3	750	18,000	31	2 3·9-in., 4 9 prs.	4	62	120
Henry, Herbert (2)	Rochefort	1911	214·6	21·6	7·8	3	450	8,600	28	6 9 prs.	2	62	..
SEA-GOING—													
Aquilon	Normand	1895	137·8	14·6	7·9	2	127	2,000	26·17	2–3 prs.	2	34	17
Archer	Normand	1893	138	14·7	6·5	2	131	1,250	21	2–3 prs.	2	26	17
Audacieux	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2–3 prs.	3	..	18
Averne	Havre (F.&C.)	1894	141	16·4	9·3	2	133	1,500	24·4	2–3 prs.	2	27	16
Borée	Bordeaux	1900	147·7	16·7	8·0	2	160	4,406	30	2–3 prs.	2	..	18
Bourrasque	Normand	1901	147·7	16·7	8·0	2	160	4,400	31·41	2–3 prs.	2	..	18
Chevalier	Normand	1893	144·3	15·7	6·8	2	134	2,700	27·2	2–1 prs.	2	32	17
Cyclone	Normand	1898	144·2	15·2	10·0	2	152	4,200	30	2–3 prs.	2	..	18
Dauphin	Havre (F.&C.)	1894	141	16·4	9·3	2	137	1,500	25·22	2–3 prs.	2	34	16
Dragon	Normand	1892	138	14·7	8·2	2	129	1,400	25	2–3 prs.	2	26	15·5
Flibustier	Normand	1894	143	16·4	9·3	2	132	1,500	23·5	2–3 prs.	2	34	16
Forban	Normand	1895	144·2	15·2	10	2	135	3,200	31·2	2–1 prs.	2	..	..
Grenadier	Normand	1892	138	14·7	8·2	2	129	1,400	25·25	2–3 prs.	2	26	15·5
Grondeur	Havre (F.&C.)	1892	147·5	14·5	5	2	130	1,550	24	2–3 prs.	2	27	20
Kabyle	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·6	3–3 prs.	2	27	17
Lancier	Normand	1893	138	14·7	8·2	2	128	1,400	25·79	2–3 prs.	2	26	15·5
Mangini	Nantes	1896	147·6	14·8	7·9	2	129	2,100	27·5	2–3 prs.	2	34	17
Mistral	Normand	1901	147·7	16·8	8·8	2	182	4,200	30	2–3 prs.	3	..	23
Orage	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·7	3–3 prs.	2	26	17
Rafale	Normand	1901	147·7	16·7	8·0	2	160	4,400	31·47	2–3 prs.	2	..	18
Sarrasin	Bourdeaux	1893	139	14·7	7·7	2	131	1,100	20·5	3–3 prs.	2	26	14
Simoum	Havre (F.&C.)	1901	144·2	15·2	10·0	2	152	4,200	30	2–3 prs.	3	..	18
Siroco	Normand	1901	147·7	16·8	8·8	2	182	4,200	30	2–3 prs.	3	..	23
Tourmente	St. Denis	1893	141	16·4	9·3	..	132	1,500	24·6	2–3 prs.	2	25	15
Tramontane	Bordeaux	1900	147·7	16·7	8·0	2	160	4,400	30	2–3 prs.	2	..	18
Trombe	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2–3 prs.	3	..	18
Typhon	Havre (F.&C.)	1901	144·2	15·2	10·0	2	152	4,200	30	2–3 prs.	3	..	18
FIRST CLASS—													
201–4 (3 boats)	Normand	1897–8	121·4	13·4	8·6	1	84	1,700	25·9	2–1 prs.	2	23	10
206–211 (5 boats)	Bordeaux	1897–8	121·4	13·6	8·6	1	86	1,500	23·5	2–1 prs.	2	23	10
212–215 (4 boats)	Normand	1899	121·4	13·6	8·6	1	86	1,800	27	2–1 prs.	2	23	10
216–226 (11 boats)	Cherbourg, Toulon, etc.	1899–1902	121·6	13·6	8·6	1	86	1,500	23·5	2–1 prs.	2	23	10
227–235 (8 boats)	Bordeaux, etc.	1901	121·4	13·2	8·7	1	86	1,500	23·5	2–1 prs.	2	23	10
236–255 (20 boats)	Bordeaux, etc.	1902	121·4	13·2	8·7	1	90	1,500	23·5	2–1 prs.	2	23	10
256–257 (2 boats)	Bordeaux, etc.	1900	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
258–261 (4 boats)	Bordeaux	1902	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
262 (1 boat)	Creusot	1902	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
264–265 (2 boats)	Bordeaux	1902	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
266–276 (11 boats)	Bordeaux, etc.	1902	124·8	13·2	9·6	1	97	2,000	26·0	2–1 prs.	3	24	10
277–294 (18 boats)	Bordeaux, etc.	1904	124·8	14·0	9·6	1	97	2,000	26·0	2–1 prs.	3	26	10
295–317 (23 boats); 318–367 (50 boats); 368–369 (2 boats)	Normand, etc.; Havre, etc.; Toulon	1905; 1905–7; 1906	124·8	14·0	9·6	1	97	2,000	26	2–1 prs.	3	26	10

* Captured from the Chinese at Taku, 1900.

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SUBMARINE—													
Aigrette	Toulon	1904	117·6	12·9	8·3	1	172	200	10·5	..	..	20	..
Algérien	Cherbourg	1901	118	9·2	..	1	146	250	8 13	..	..	9	..
Alose	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Anguille	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Bonite	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Calypso	Toulon	1907	154·3				344				7	..	..
Castor	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Cigogne	Toulon	1904	117·6	12·9	8·3	1	172	200	10·5	..	..	20	..
Circé	Toulon	1907	154·3				344				7	..	..
Dorade	Toulon	1903	77	7·6	8·0	1	68	60	8		..	5	..
Emeraude	Cherbourg	1906	146	12·9	12·0	2	390	600	12	..	6	16	..
Espadon	Cherbourg	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Esturgeon	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Follet	Rochefort	1901	135·8	9 5	9·5	1	185	..	8–12½	..	..	9	..
Français	Cherbourg	1901	118	9·9	..	1	146	250	8–13	..	..	9	..
Gnome	Rochefort	1901	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Grondin	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Korrigan	Rochefort	1901	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Loutre	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Ludion	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Lynx	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Méduse	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Naïade	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Opale	Cherbourg	1906	146	12·9	12·0	2	390	600	12	..	6	..	..
Otarie	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Oursin	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Perle	Cherbourg	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Phoque	Rochefort	1904	77	7·6	8·0	1	68	60	8	..	..	5	..
Protée	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Rubis	Cherbourg	1907	154·3	12·9	12·0	2	390	600	12	..	6	16	..
Saphir	Toulon	1908	146	12·9	12·0	2	390	600	12	..	6	..	..
Silure	Cherbourg	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Sirène	Cherbourg	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Souffleur	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Thon	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Topaze	Cherbourg	1908	146	12·9	12·0	2	390	600	12	..	6	..	..
Triton	Cherbourg	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Truite	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Turquoise	Toulon	1908	146	12·9	12·0	2	390	600	12	..	6	..	..
Dauphin	Cherbourg	1904	122·8	10·2	7·6	2	168	220	10½	..	..	..	..
Argonaute	Toulon	1905	160·6	13·9	9.0	1	301	330	11	..	4	20	..
Pluviôse, Ventôse, Nivôse, Germinal, Floréal, Prairial, Messidor, Thermidor, Fructidor, Vendémiaire, Brumaire, Frimaire	Cherbourg	1907 to 1912	160	16·4	13·6	2	398	700	7¾–12½	..	7	24	..
Papin, Fresnel, Berthelot	Rochefort	1908 1909	160	16·4	13·6	2	398	700	7¾–12½	..	7	24	..
Monge, Ampère, Gay-Lussac	Toulon	1908 & 1909	160	16·4	13·6	2	398	700	7¾–12½	..	7	24	..
Foucault, Euler, Franklin, Watt, Cugnot, Giffard, Faraday, Volta, Newton, Montgolfier, Bernouilli, Joule, Coulomb, Arago, Curie, Le Verrier, (16, Prog. 1905–6)	Cherbourg, Rochefort, Toulon	1909 & Bldg.	160	16·4	13·6	2	398	700	7¾–12½	..	7	24	..
Amiral Bourgeois	Cherbourg	Bldg.	184·6	26·3	..	2	555–735	1,560	10–15	..	7	25	..
Archimède	Cherbourg	1909	211·9	30·2	..	2	577–810	1,700	10–15	..	7	27	..
Mariotte	Cherbourg	1911	212·6	..	..	2	530–625	1,440	10–15	..	6	25	..
Charles Brun	Cherbourg	1910	144·6	13·6	..	2	355–450	..	10–15	..	7	20	..
Clorinde, Cornélie	Rochefort	Bldg.	174	16·9	10·9	2	391	1,300	15·8	..	7	20	..
Gustave Zédé, Néréide	Cherbourg	1911	239 6	19·8	14·4	2	780–1000	..	10–20	..	..	..	..

Submersibles Q 94 and 95 (Cherbourg), Q 96–99 (Toulon), Q 100 and 101 (Cherbourg), Q 102 (Rochefort), provided for—Estimates, 1912.

Germany.

Name or Number.	Where built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
D 3, D 4 (2 boats)	Elbing ..	1888	184	21·8	9·6	2	300	2,000	20	4 6-pr. 2 1-pr. revs.	3	48	90
D 5, D 6 (2 boats)	Elbing ..	1888–9	190·3	23	9·6	2	320	3,000	22½	4 6-pr. 2 1-pr. revs.	3	48	90
D 7, D 8 (2 boats)	Elbing ..	1890	190·3	23	9·9	2	380	3,500	22½	6 Q.F.	3		
D 9	Elbing ..	1894	197·0	24·3	9·9	2	380	4,500	26	6 Q.F.	3		
D 10	Chiswick ..	1898	211·9	19·6	8·1	2	310	5,800	28·5	5 3-pr.	3	52	80
Taku (ex Hai Ying)	Elbing ..	1898	183·7	21·0	..	2	280	6,000	30	6 3-prs.	2	...	67
S 90-101 (12 boats)	Elbing ..	1900	200	23	8·9	2	350	6,000	27·5	3 3-pr.	3		
S 102–107 (6 boats)	Elbing ..	1900–1	200	23	8·9	2	350	6,000	27·5	3 3-pr.	3		
G 108–113 (6 boats)	Kiel(Germania)	1901–2	200	22	8·9	2	350	6,000	29·2	3 3-pr.	3	49	100
S 114–119 (6 boats)	Elbing ..	1902–3	200	23	8·9	2	350	6,000	29·2	3 3-pr.	3	49	100
S 120–125 (6 boats)	Elbing ..	1904	200	23	8·9	2	350	6,000	29·2	3 3-pr.	3	49	100
S 126–131 (6 boats)	Elbing ..	1904–5	205	23	..	2	420	6,000	30	3 6-pr.	3	56	100
G 132–136 (5 boats)	Kiel(Germania)	1906	207·4	23	8·9	2	420	6,500	28	4 6-pr.	3	..	..
G 137	Kiel(Germania)	1907	226·4	25·4	9·8	3	570	10,000	32	1 14-pr.3 3 pr.	3	72	170
S 138–149 (12 boats)	Elbing.. ..	1906–7	331	25·7	8·9	2	530	10,000	30	1 23-pr.3 4-pr.	3	72	170
V 150–161 (12 boats)	Stettin(Vulcan)	1907–8	269	25·7	10·0	2	670	10,500	30	2 23-pr. 2 M.	3	83	175
V 162–164 (3 boats)	Stettin(Vulcan)	1908–9	..	..	..	..	616	15,000	30	2 23-pr. 2 M.	3	..	160
S 165–168 (4 boats)	..	..	..	..	..	..	..	..	..	..	..	..	..
G 169–173 (5 boats)	Kiel(Germania)	1908–9	..	..	..	..	616	15,000	30	2 23-pr. 2 M.	3	..	160
G 174–175 (2 boats)	Kiel(Germania)	1909 and 1910	233	25·9	7·6	..	640	16,000	32·5	2 23-pr. 2 M.	4	83	180
S 176–179 (4 boats)	Elbing ..												
V 180–185 (6 boats)	Stettin(Vulcan)												
G 186–191 (6 boats)	Kiel(Germania)	1910	233	25·9	7·6	..	640	16,000	32·5	2 23-pr. 2 M.	4	83	180
V 192–197 (6 boats)	Stettin(Vulcan)	1911	233	25·9	7·6	..	640	16,000	32·5	2 23-pr. 2 M.	4	83	180
V 1–V 6 (6 boats)	Stettin(Vulcan)	1911	..	..	..	..	..	..	32½	..	..	..	..
G 7–G 12 (6 boats)	Kiel(Germania)	1912	..	..	..	..	..	..	32½	..	..	..	..
FIRST CLASS—													
T 42—T 47 (6 boats)	Elbing ..	1892	150	15·6	6·7	..	85–88	1,600	20–22½	2 1-pr. revs.	2	..	17
T 49—T 57 (9 boats)	Elbing ..	1893	154·3	16·4	..	2	110 / 145	1,600	..	..	3		
S 58—S 87 (30 boats)	Elbing ..	1894–8	158·2	16·9	9·0	2	140	2,300	26	2 1-pr. revs.	3	..	32
G 88—G 89 (2 boats)	Kiel(Germania)	1898	154·3	16·5	..	..	160	2,500	26	2 mach.	3	22	

NOTE.—The German destroyers (from S 90 downward) are given above in groups showing successive yearly programmes, the last series being that of 1911.

The Estimates of 1912 provide for the building of two divisions of destroyers (12 boats). A submarine boat (U 1), 180 tons, 128 ft. long, 8 ft. 10 in. beam, submerged displacement 240 tons, speed 12 and 9 knots, launched at the Germania Yard, August 30, 1905; U 2 to U 16 built at Germania Yard and Danzig; others building. The V destroyers have A.E.G. turbines; S boats, Schichau; and most of the G boats Parsons turbines (G 173, Zoelly).

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Naukratoussa ..	Yarrow ..	1906	220	20·6	7·2	2	350		32·1	2 12, 4 6-pr.	2	58	80
Thyella									31·79				
Sphendoni									31·84				
Lonchi									32·53				
Nike..	Stettin (Vulkan)	1906	220	20·6	7·2	2	350	..	30	2 12, 4 6-pr.	2	58	80
Aspis													
Doxa..													
Velos													
SUBMARINE—													
Delphin	Chalon sur Saône ..	1911	164	..	..	..	300–460	..	14·9	..	5	..	..

Some additional destroyers are projected.

Italy.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons		Knots.				Tons.
Destroyers—													
Fulmine	Sestri (Odero)	1898	200	20·4	5·4	2	298	4,800	28	1 12-pr. 3 6-pr. Q.F.	3	43	60
Lampo, Freccia, Dardo, Strale, Euro, Ostro	Elbing (Schichau)	1899 1901	196·8	21·3	5·8	2	320	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Nembo, Turbine, Aquilone, Borea, Meteoro, Tuono	Naples (Pattison)	1901 1902	210	19·4	7·6	2	330	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Zeffiro, Espero	Naples (Pattison)	1904	210	19·4	7·6	2	330	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Bersagliere, Artigliere, Granatiere, Lanciere, Alpino, Corazziere, Pontiere, Carabinieri, Fucilieri, Garabaldino	Genoa (Ansaldo, Armstrong)	1906 1907 … 1909 1910	211·6	20·0	7·6	3	365	6,000	30	4 12-pdr.	3	55	82
Impavido, Impetuoso, Indomito, Insidioso, Intrepido, Irriquieto, 6 others	Pattison (Naples) 6, Ansa'do (Genoa) 3, Orlando (Leghorn) 3	Bldg.	246	24·6	7·6	..	650	..	30	1 4·7 in. 4 12-pr.	2	..	..
Ardito, Ardente, Audace, Animoso	Orlando (Leghorn)	Bldg.	246	24·6	7·6	..	650	..	30	1 4·7 in. 4 12-pr.	2	..	..
First Class—													
Aquila, Sparviero, Nibbio, Avvoltolo	Elbing	1888	152	17·2	7·9	2	130	2,200	26·6	2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.	3	24	40
Pellicano	Sestri (Odero)	1899	157·4	19	14·8	2	147	2,700	25	2 3-pr.	2	28	24
Condore	Sestri (Ansaldo)	1898	154·3	16·8	6·9	2	136	2,500	27	2 3-pr.	2	27	16
Sirio, Sagittario	Elbing	1905-6											
Spica, Scorpione	Elbing	1905 6											
Serpente, Saffo	Elbing	1905-6											
Alcione, Ardea, Albatros, Aiorone, Astore, Arpia	Odero	1905 1906	164	19·6	6·3	2	215	2,900 3,250	25	2 3-pr.	2	..	40
Orione, Orsa, Olympia, Orfeo	Genoa (Ansaldo)	1905 1906											
Gabbiano	Spezia	1907											
Pegaso	Naples (Pattison)	1905											
Perseo	Naples (Pattison)	1905											
Procione	Naples (Pattison)	1905											
Pallade	Naples (Pattison)												
Cigno	Naples (Pattison)												
Cassiopea	Naples (Pattison)	1906	164	17·4	7·0	2	200	3,000	25·4 26·6	3 3-pr.	3		40
Calliope	Naples (Pattison)	1907											
Clio	Naples (Pattison)	1906											
Centauro	Naples (Pattison)	1907											
Canopo	Naples (Pattison)	1907											
Calipso	Naples (Pattison)	1909											
Climene	Naples (Pattison)	1909											
1 P.N.-12 P.N.	Pattison	Bldg.											
13 O.S.-24 O.S.	Odero	Bldg.					120						
25 A.S.-32 A.S.	Ansaldo	Bldg.											
Second Class—													
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1 pr. Q.F.	2	17	17
Nos. 136-8, 140-2 (6 boats)	Italy	1893-94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147, 149-152 (5 boats)	Italy	1894-5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17

Italy—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SUBMARINE—													
Delfino	Spezia	1894	78·6	10·1	..	1	111	150	10–12	..	2	12	..
Glauco, Squalo, Narvalo, Otaria, Tricheco	Venice, &c.	1906 1907 1909	120	14·3	..	..	180 230	..	15	..	2	..	..
Foca, Medusa, Velella, Argo, Falea ..	Muggiano ..	1908 & Bldg.	139·6	14·2	..	..	241 297	750	10·15 8·3	..	2	..	..
Fantina, Salpa ..	Spezia (Cantieri)												
Fisalia, Zoea	Leghorn ..												
Nautilus, Nereide ..	Venice ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
G. Pullino, G. Ferraris	Spezia ..	Bldg.	..	..	..	..	400	..	18–14	..	..	..	..
Atropo	Kiel (Germania)	1912	..	..	..	..	330	..	13	..	..	..	..

Ten destroyers (500 tons) and thirty torpedo-boats are in the programme of 1911. The new Italian destroyers have Thornycroft water-tube boilers.

Japan.

Name or Number.	Where Built.	Launched.	Dimensions Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Murakumo	Thornycroft	1898	210·0	19·5	7·2	2	307	5,800	30 to 31	1 12-pr., 5 6-prs.	2	54	80
Shinonome	Thornycroft	1898											
Yugiri	Thornycroft	1898											
Shiranui	Thornycroft	1899											
Kagerou	Thornycroft	1899											
Usugumo	Thornycroft	1900											
Shirakumo	Thornycroft	1901	216·7	20·7	8·3	2	373	7,400	31	1 12-pr., 5 6-prs.	2	59	96
Asashio	Thornycroft	1902											
Ikadsuchi	Yarrow ..	1898	220·0	20·6	9·6	2	311	6,000	31	1 12-pr., 5 6-prs.	2	55	95
Akebono	Yarrow ..	1899											
Sazanami	Yarrow ..	1899											
Oboro	Yarrow ..	1899	220·3	20·6	9·6	2	311	6,000	31·62	1 12-pr., 5 6-prs.	2	..	90
Niji	Yarrow ..	1899	220·3	20.6	9·6	2	308	6,000	31·15	1 12-pr., 5 6-prs.	2	..	90
Kasumi	Yarrow ..	1902	220·3	20·6	9·6	2	335	6,000	31	1 12-pr., 5 6-prs.	2	..	..
Asagiri	Yokosuka ..	1902	220·3	20·6	9·6	2	374	6,000	29	1 12-pr., 5 6-prs.	2	..	..
Murasame	Yokosuka ..	1902											
Yamabiko	Port Arthur	1903	196·9	18·4	11·5	2	250	6,000	27	1 12-pr., 5 3-prs.	2	..	80
Fnmizuki	Port Arthur	1903											
Satsuki	St. Petersburg	1902											
Hatsushima	Yokosuka ..	1905	220·3	20·6	9·6	2	374	6,000	29	6 12-pr.	2	..	..
Yayoi	Yokosuka ..	1905											
Kisaragi	Yokosuka ..	1905											
Hibiki	Yokosuka ..	1906											
Wakaba	Yokosuka ..	1905											
Hatsuyuki	Yokosuka ..	1906											
Kamikaze	Yokosuka ..	1905											
Ariake	Yokosuka ..	1905											
Fubuki	Yokosuka ..	1905											
Arare	Yokosuka ..	1905											
Yunagi	Maizuru ..	1906											
Oite	Maizuru ..	1905											
Asakase	Kobe	1905											
Harukase	Kobe	1905											
Shigure	Kobe	1906											
Hatsuharu	Kobe	1906											
Yuguri	Sasebo	1905											
Yudachi	Sasebo	1906											
Mikadzuki	Sasebo	1906											
Nowake	Sasebo	1906											
Uschio	Kure	1905											
Nenohi	Kure	1905											
Shiratsuyu	Nagasaki ..	1906											
Shirayuki	Nagasaki ..	1906											

Japan—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—*contd.*													
Matsukase	Nagasaki	1906											
Shirotaye	Nagasaki	1906											
Asatsuyu	Osaka	1907											
Hayakase	Osaka	1906											
Kikutsuki	Uraga	Bldg.											
Minatsuki	Uraga	Bldg.	220·3	20·6	9·6	2	374	6,000	29	6 12-prs.	2	..	..
Nagatsuki	Uraga	1907											
Utsuki	Uraga	1907											
Isonami	Yokosuka	1909											
Uranami	Yokosuka	1909											
Ajanami	Yokosuka	1909											
Kaifu	Maizuru	1909											
Umikaze	Nagasaki	1910	..	..	..	..	1200	20,500	35	2 4 7-in., 5 3-in.	3	..	..
Yamakase	..	1911											
Sakura	Kure	Bldg.	..	..	..	..	700	18,000	33	2 3 9 in., 4 12-pr.	2	..	..
Tashibana	Kure	Bldg.											
FIRST CLASS—													
Hayabusa	Normand	1898											
Kasasagi	Normand	1899	147·7	16·0	8·2	2	150	4,200	30	1 6-pr., 2 3-prs.	3	26	30
Manadzuru	Normand	1899											
Chidori	Normand	1900											
Shirataka	Elbing	1899											
Aoataka	Kure	1903											
Hato	Kure	1903											
Hibari	Kure	1903											
Kari	Kure	1903											
Kiji	Kure	1903	147·7	16·0	8·2	2	150	4,200	27	1 6-pr., 2 3-prs.	3	26	30
Tsubame	Kure	1903											
Hashitaka	Kawasaki	1902											
Kamone	Kure	1904											
Otori	Kawasaki	1904											
Sagi	Kure	1902											
Uzuri	Kure	1902											
Fukuriu	Kiei	1895	..	..	..	..	115	..	..	..	..	..	..
SECOND CLASS—													
2 boats	Kobe	1901	..	..	..	..	83	..	..	..	..	..	..
10 boats	Yarrow	1900	152·6	15·3	7·9	..	..	1,900	27	2 3-prs	3	..	36
16 boats	Elbing	1891–9	..	..	..	..	..	..	..	..	..	..	..
1 boat (No. 24)	Normand	1891	118	13·1	6·9	1	80	1,200	23	2 1-prs.	2	21	10
2 boats	Normand	1898	121·4	13·6	8·6	1	86	1,800	27	1 3-pr.	2	..	10
SUBMARINES—	[U.S.A.												
5 boats	Fore River,	1904–5	65	12	..	..	120	..	8	..	1	..	..
2 boats	Japan	1906	..	..	..	..	60·80	..	..	..	1	..	..
2 boats	Vickers	1908	135	13·5	..	..	325	..	14	..	2	..	..
5 boats	Kawasaki	1911	..	..	..	..	..	..	..	..	..	..	..

Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Wolf, Fret (1909) .. Bulhond, Jakhals (1910)	Flushing ..	1910 Bldg.	230	20·6	..	2	480	7,500	30	4 12-pr., 4 M.	2	84	80
FIRST CLASS—													
Ardjoeno	Yarrow ..	1886	125	13	6	1	83	800	21	2 1-prs.	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Yarrow ..	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Scylla	Yarrow ..	1900	130	13·6	6·0	1	77	1,200	24·3	2 1-prs.	3	18	20
Hydra	Yarrow ..	1900	130	13·6	6·0	1	77	1,200	24·4	2 1 prs.	3	18	20
Ophir	Yarrow ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Pangrango	Yarrow ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Rindjani	Yarrow ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Smeroe	Fijenoord ..	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Tangka	Fijenoord ..	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Wajang	Fijenoord ..	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Minotaurus, Python	Flushing ..	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Zeeslang .. .. .. Krokodil .. .. .. Draak .. .. .. Sfinx .. .. Scylla	Flushing ..	1905	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Meijndert Jentjes .. Johan van Brakel .. Van de Rijn .. .. Willem Willemsze ..	Flushing, Rotterdam, & Fijenoord	1904	154·3	16·5	7·9	1	141	2,000	25	2 3-prs.	3	24	40
Roemer Vlacq .. Pieter Constant .. Jacob Cleydijk .. Janssen de Haan ..	Do. ..	1906	154·3	16·5	7·9	..	144	2,000	26	2 3-prs.	3	21	40

All the Poplar destroyers have Yarrow water-tube boilers, and the later ones are fitted for the consumption of oil fuel. Four torpedo-boats of the Ophir class improved, 180 tons, 2 12-prs., are to be built. Four destroyers are in hand for the Indian Marine, first instalment voted 1911.

Submarine boat, No. 1 (120 tons). Nos. 2 and 3, 132-150 tons, 11-8 knots, 2 tubes. Nos. 4 and 5 are being built by Messrs. Whitehead, Fiume, 380 tons, 151 ft. 6 in. long, 16 knots (surface), 11 knots (submerged) speed. A boat is being built for the East Indies, 150 tons (submerged), 105 ft. long, 10 ft. beam, 300 h.p. (Diesel), and 300 h.p. (electric), 16 knots (surface), 11 knots (submerged speed), 2 tubes. Two submarines to be completed 1912.

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Valkyrien	Elbing ..	1896	190	24·3	9·3	1	374	3,300	23·2	2 12-pdrs. 4 1-pdrs.	2	59	90
Draug .. .. .. Troll..	Christiania.. Christiania..	1908 Bldg.	226	25·0	..	2	550	7,500	27·0	6 12-pdrs.	3	71	95
FIRST CLASS—													
Varg (8), Raket (9)	Christiania..	1894	111·5	12·4	..	1	43	..	..	..	2	..	..
Hval, Delfin, Hal (3 boats)	Elbing ..	1896	128·0	15·0	6·9	1	84	1,190	24·5	2 1·4-in. Q.F.	2	..	..
Storm, Brand, Trods	Christiania ..	1899	128·0	15·0	..	1	84	1,100	23	2 1·4-in. Q.F.	2		
Laks, Sild, Sael, Skrei	Christiana ..	1900	128·0	15·0	6·9	1	84	11,000	23	2 1·4-in.	2	..	..
Kjeck, Hvas, Dristig, Kvik, Djerv, Blink, Glint, Hauk, Falk	Christiana ..	1898 1903	111·5	14·5	6·3	1	65	650	19	2 1·4-in.	2	..	..
Skarv, Teist, Lom, Jo, Grib	Christiana ..	1906–7	134·5	14·9	..	1	100	1,700	25·0	2 3-pr.	..	..	..
Ravn, Orn	Christiana ..	1903	119	14·9	6·4	1	73	1,035	22·5	2 1·4-in.	2	14	13
SUBMARINE—													
Kobben	Germania Kiel	1909	131·6	14·9	..	..	205	440	12	..	3	..	..
Nos. 2, 3, 4	Germania Kiel	Bldg.					255	250	9				

Provision made for a destroyer, and a torpedo-boat, Skarv class, is in hand.
A submarine of the Kobben class is to be built.

Portugal.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Destroyer..	Lisbon ..	Bldg.	240	23·6									
5 boats (5–9)	Elbing ..	1890–92											
Mineiro	Lisbon ..	1893	..	..	..	..	..	..	12				

Three torpedo-boats building in France. A submarine has been built at the F.I.A.T. San Giorgio Yard, Muggiano.

Roumania.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet	Feet.		Tons.		Knots.				Tons.
Naluka	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Sborul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Smeul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12

8 100 ft. Torpedo Vedette Boats built by the Thames Iron Works. 4 built by Schichau, 1904, Vedea, Argosul, Trotosul, Teleorman, for the Danube.

Russia.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BALTIC SEA.													
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Kondratenko, Okhotnik, Pogranitschuik, Siberskij-Strelok ..	Abo and Helsingfors	1905	250·3	27·0	8·9	2	625	7,300	25–26	2 12-pdrs. 6 6-pdrs.	3	100	191
Amuretz, Gaidamak, Ussurietz, Vsadnik .	Kiel (Germania)	1905 1906	232·9	23·7	7·9	2	560	6,500	25–26	2 12-prs. 6 6-prs.	3	98	180
Emir Bukharsky, Dobrovoletz Finn, Moskvityanin.. ..	Helsingfors	1905	238	27·0	8·6	2	580	6,500	25–26	2 12-pdrs. 6 6-pdrs.	3	98	134
Donskoi – Kasak, Kasanetz, Sabaikaletz, Steregushtshi, Strashny, Trukhmenetz - Stavropolski, Ukraina, Voiskovoi	Riga	1904 1906	239·9	23·7	7·6	2	508	6,200 7,020	25–27	2 12-pdrs. 4 6-pdrs.	2	90	50 120
Prytki	Poplar.. ..	1895	190	18·6	7·0	2	240	4,400	29.7	1 12-pr, 3 3-pr	2		
Revy, Retivy, Ryany, Rezviyi, Prosorlivy, Ridny, Poslnchny, Protchny, Poratsuchtchi, Podvitsny ..	Abo, Ishora & Nevsky ..	1898	196·9	18·4	11·5	2	240	3,800	27	1 12-pr, 3 3-pr	2	55	53
Bravi, Vidny, Bodry	Nevsky and Ishora ..	1900–2	196 9	18·4	11·5	2	350	6,000	27	1 12-pr, 5 3-pr	3	62	80
Grozni, Grosiashtchi	St. Petersburg	1904	196·9	18·4	11·5	2	350	6,000	27	1 12-pr, 5 3-pr	3	62	80
Tverdy, Totschny, Trevoshny	Abo	1905	196·9	18·4	11·5	2	240	6,000	27	1 12-pr, 5 3-pr	3	62	80
Iskousny, Ispolnitelni, Kriepky, Legky	La Seyne ..	1905	185·9	21·0	7·5	2	324	5,600	26	1 12-pr, 5 3-pr 2 M	2	60	30 100
Lovki, Letutshi, Lichoi	Havre (Normand)	1905	185·8	21·0	7·5	2	324	5,6C0	27·5	1 12-pr, 5 3-pr 2 M	2	60	30 100
Boievoi, Bditelny, Burni, Vnimatelni, Vnushitelni, Vynoslivny, Sergieff, Yurasovsky, Svlereff, Dmitrieff	Elbing Schichau	19 5–6	208·9	23·0		2	365	6,500	28		3		95
Silni, Storoshevoi, Stroiny, Rasyashtshy, Rastoropny, Burakoff, Dyelni, Dostolny, Deyatelni, Myetky, Molodetsky, Moshtshny, Malieieff, Anastosoff	St. Petersburg and Ochta	1905 1907	185·9	21·0	7·5	2	335 56	5,600	26	1 12-pr, 5 3-pr 2 M	2	60	30 100
FIRST CLASS—													
Aspen	Ishora.. ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Domeness	Putiloff ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Transund	Ishora.. ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
2 boats	St. Petersburg	1896	128	16	6·9	2	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	1897	138	14·7	9·9	2	120	..	25	..	2	26	
8 boats	Nevsky ..	1898	..	..	..	..	118						
BLACK SEA.													
DESTROYERS—													
Baranoff, Sheslakoff, Puatchin, Sazarenny	Nicolaieff ..	1907–8	211·6	27·0	7·9	2	614	6,500	25	6 12-pdrs.	3	90	200
Zavidni, Zavetni, Zharki, Zhutki, Zhivol, Zhivulka, Zhivutshtshy ..	Nicolaieff ..	1903-4	210	21·2	7	2	350	5,500	27	1 12-pr, 5 3-pr	2		
Stremitelini, Strogi, Smetlivy, Svirepy	Abo	1901	190·4	18·5	11·5	2	240	3,800	27	1 12-pr, 3 3-pr	2	..	60
Zadorni, Zorki, Zvonki	Nicolaieff ..	1903	210	21·2	7	2	350	5,500	27	1 12-pr, 5 3-pr	2		
Bespokolny													
Bystry, Dersky, Gnievny, Gromky Pospieschny, Pronsltelni, Pilky, Stshastlivy	Nicolaieff .. Nevsky, Putiloff, &c.	Bldg.	..	..	..	..	1,050	..	33	..	.	..	..
FIRST CLASS—													
A. B. C. (3 boats) ..	Nicolaieff ..	1893	126	..	..	..	81	..	21				
D. E. (2 boats) ..	Sebastopol ..	1893	128	..	..	..	85	..	22				
FAR EAST.													
DESTROYERS—													
Bespochtchadni, Bestrachni, Beachumni (3 boats)	Elbing ..	1899	196·9	18·4	11·5	1	350	6,000	27	1 12-pr, 5 3-pr	2		
Grozovoi, Vlastni ..	Havre (F. & C.)	1900–2	186·0	20·8	10·3	2	300	5,000	28	1 12-pr 5 3-pr	2	..	80
Bolki	Nevsky ..	1900	196·9	18·4	11·5	1	350	6,000	28	1 12-pr, 5 3-pr			

Submarine Plotr Koschka (experimental), Delfin (77 ft., 175 tons), Graf Sheremeteff completed at St. Petersburg; Akula, Alligator, Drakon, Kaiman, Krokodil, Minoga (400 tons, Lake type); also Kefal, Akula, Makrel, Bytshok, Nalius, Kata, Paltus Delfin, Karp, Kambala, Karas (210 tons); Bialuga, Pescar, Shtshuka, Som, Sterliad; 13 others built or building, Lossos in the Black Sea. A submersible of 500 tons has been provided for by subscription. Two destroyers of 1320 tons and 35 knots are building at the Putiloff and Baltic Yards, St. Petersburg Submaries Kashalot, Morsh, Kit, Narval, Nerpa, Tiuleny, are built or building for the Black Sea; and 9 destroyers, 450 tons, are in hand.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Terror .. .. Audaz	Clydebank ..	1896	220	22	5·6	2	300	6,000	28	2 12-pr. 2 6-pr. 21-pr.	2	67	100
Osado .. .. Proserpina	Clydebank ..	1897	225	25·6	5·8	2	400	7,500	30	2 14-pr. 2 6-pr. 21-pr.	2	70	90
Bustamente .. .. Villamil .. .. Requescens	Cartagena .. Cartagena .. Cartagena ..	Bldg.	220	22	7·5	..	370	6,250*	28	5 6-pr.	2	..	..
FIRST CLASS—													
24 boats	Cartagena ..	Bldg. Pro.	165	16·6	..	..	180	3,750*	26	3 3-pr.	3	..	..
Azor	Poplar.. ..	1887	131·5	14	6	1	108	1,600	24	4 3-pr.	3	23	25
Halcón	Poplar	1887	134·5	14	..	1	108	1,600	24	4 3-pr.	3	23	25

Azor and Halcón re-boilered by Yarrow (water-tube). * Turbines and Normand type boilers.

Sweden.

TORPEDO-BOATS.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Mode	Yarrow ..	1902	220·3	20·6	8·9	2	400	6,800	32·4	1 12-pr. 5 6-prs.	2	55	95
Magne .. .. Wale.. .. .. Ragnar .. .. Sigurd .. .. Vidar .. .. Hugin .. .. Munin	Thornycroft Malmo .. Malmo .. Gothenburg Malmo .. Gothenburg Malmo ..	1905 1906 1909 1909 1909 1909 1910	216·9	20·8	8·2	2	430	7,200	30·0	2 12-prs. 4 6-prs.	2	63	90
FIRST CLASS—													
Komet	Elbing ..	1896	128	15·9	6·11	1	92	1,056	23·0	2 1·9-in. Q.F.	2	16	17
Blixt..	Carlskrona..	1898	128	15·9	6·11	1	92	1,260	23·5	2 1·9-in. Q.F.	2	18	17
Meteor	Carlskrona..	1899	128	15·9	6·11	1	92	1,330	23·8	2 1·9-in. Q.F.	2	18	17
Stjerna	Carlskrona..	1899	128	15·9	6·11	1	92	1,250	23·4	2 1·9-in. Q.F.	2	18	17
Orkan	Carlskrona..	1900	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Vind	Carlskrona..	1900	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Bris	Carlskrona..	1900	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Virgo	Carlskrona..	1902	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Mira	Carlskrona..	1902	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Orion .. .. Sirius .. .. Kapella	Carlskrona..	1903	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Pleiad	Normand ..	1905	125	15	6·6	1	96	1,900	26	2 1·5-in. Q.F.	2	18	20
Vega .. .. Vesta	Carlskrona..	Bldg.	125	17·5	8·6	1	105	1,900	25	1 6-pr. 1 1·4-in.	2	18	20
Spica, Astrea, Iris, Thetis	Bergsund and Gothenburg	Bldg.	125	17·5	8·6	1	105	1,900	25	1 6-pr. 1 1·4-in.	2	18	20
Altair .. .. Antares .. .. Argo .. .. Arcturus	Stockholm ..	1908	128	17·5	8·6	..	110	2,000	25	2 6-prs.	2	18	20
Perseus, Polaris .. Regulus, Rigel .. A, B, C, D	Bergsund .. Stockholm .. Carlskrona & Gothenburg	1912 Bldg.	128	17·5	8 6	1	110	2,000	25	12 6-pr.	2	18	20
SECOND CLASS—													
No. 75	Stockholm ..	1892	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 77	Carlskrona.	1891	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 79	Stockholm ..	1902	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 81	Stockholm ..	1902	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 83	Stockholm ..	1903	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 85	Stockholm ..	1903	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
THIRD CLASS—													
Nos. 141, 143, 145, 147, 149 (5 boats) ..	Stockholm ..	1879 1890	55·0	10·7	4·1	2	21	80	10	..	2	..	1·5
SUBMERSIBLES—													
Enroth	Stockholm ..	1902	82·0	13·0	11·6	2	146	100	12-11	..	1	..	..
Hajen	Stockholm ..	1903	65·0	11·6	..	..	120	200	10-7	..	..	..	..
Hvalen	Muggiano ..	1908	139·6	14·2	6·9	..	185–235	750	15–7¼	..	2	15	..

Three submersibles provided for, of which one (Hvalen type) have been built at Stockholm.

Turkey.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Berk-Efshan	Kiel	1894	187	21·6	..	2	270	1,200	25	6 1-pr. revs.	2		
Tajjar	Kiel	1894	187	21.6	..	2	270	..	25	6 1-pr. revs.	2		
Samsoun .. .. .., Basra.. .. .. .., Tassos .. .. .., Yar-Hissar	Bordeaux ..	1907–8	184·9	19·6	9·6	2	280	..	28	1 9-pr., 6 3-pr.	2	..	26
Jadighiar-i-Millet .., Muavenet-i-Millet,.., Mahabet-i-Watan .., Nuhum-i-Hamijet ..	Elbing (Schichau)	1909	236·6	25·6	12·3	2	610	14,000	35	2 3·4 in. 2 M.	3	..	160
FIRST CLASS—													
Ac-Hisar	Sestri Ponente	1904	165·8	18·6	4·5	..	165	2,200	27				
Urffa, Antalia, Tokat, Deradj, Kulabia, Mossul	Sestri Ponente	1906	165·8	18·6	4·5	..	165	2,200	24				
A. B...	Sestri Ponente	1901	166	18·6	4·0	2	145	2,400	26	2·1 pr.	2	..	16
Edjder (No. 10) ..	Kiel	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
5 boats	Kiel	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
2 boats	Kiel	1892	127	..	..	..	..	..	22				

Some of the above vessels may have been destroyed in the war. Ten destroyers are intended to be purchased or built.

United States.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament. Guns.	Torpedo Tubes.	Complement.	Maximum Coal Capacity.
DESTROYERS—			ft. in.	ft. in.	ft. in.		Tons.		Knots.				Tons.
Smith	Philadelphia	1909	289 0	26 0	8 0	3	700	10,362*	29·5 *t.*			89	285
Lamson	Philadelphia	1909	289 0	26 0	8 0	3	700	10,000*	29·5			89	285
Preston	Camden, N.J.	1909	289 0	26 0	8 0	3	700	10,000*	28			89	279
Flusser	Bath, Me. ..	1909	289 0	26 0	8 0	3	700	11,842*	30·41 *t.*			89	295
Reid	Bath, Me. ..	1909	289 0	26 0	8 0	3	700	12,734*	31·82 *t.*			89	295
Paulding	Bath, Me. ..	1910	289 0	26 1½	8 4	3	742	12,000*	29·50			89	210
Drayton	Bath, Me. ..	1910	289 0	26 1½	8 4	3	742	12,000*	29·50			89	210
Roe	Newport News, Va.	1909	289 0	26 1½	8 4	3	742	12,000*	29·50			89	210
Terry	Newport News, Va.	1909	289 0	26 1½	8 4	3	742	12,000*	29·50			89	210
Perkins	Quincy, Mass.	1910	289 0	26 1½	8 4	2	742	12,000†	29·50			89	216
Sterrett	Quincy, Mass.	1910	289 0	26 1½	8 4	2	742	12,000†	29·50	5 3-in., 2 M.	3 18-in.	89	216
McCall	Camden, N.J.	1910	289 0	26 1½	8 4	3	742	12,000*	33·0			89	210
Burrows	Camden, N.J.	1910	289 0	26 1½	8 4	3	742	12,000*	29·50			89	210
Warrington ..	Philadelphia	1910	289 0	26 1½	8 4	2	742	12,000‡	30			89	210
Mayrant	Philadelphia	1910	289 0	26 1½	8 4	2	742	12,000‡	29·50			89	210
Monaghan ..	Newport News	1911	289 0	26 1½	8 4	3	900	12,000*	30			89	210
Trippe	Bath, Me. ..	1911	289 0	26 1½	8 4	3	900	12,000*	29·50			89	210
Walke	Quincy, Mass.	1911	289 0	26 1½	8 4	2	900	12,000†	29·50			89	216
Ammen	Camden, N.J.	1911	289 0	26 1½	8 4	3	900	12,000*	29·50			89	210
Patterson	Philadelphia	1910	289 0	26 1½	8 4	3	900	12,000*	30			89	210
Bainbridge ..	Philadelphia	1901	215 0	23 7	6 6	2	420	8,000	28·45	2 14-pr., 5 6-pr.§	2	64	139
Barry	Philadelphia	1902	215 0	23 7	6 6	2	420	8,000	28·13	2 14-pr., 5 6-pr.	2	64	139
Chauncey.. ..	Philadelphia	1901	215 0	23 7	6 6	2	420	8,000	28·64	2 14-pr., 5 6-pr.	2	64	139
Dale	Richmond ..	1900	215 0	23 7	6 6	2	420	8,000	28	2 14-pr., 5 6-pr.	2	64	139
Decatur	Richmond ..	1900	215 0	23 7	6 6	2	420	8,000	28·10	2 14-pr., 5 6-pr.	2	64	139
Hopkins	Wilmington	1902	244 0	24 6	6 0	2	408	8,456	29·02	2 14-pr., 5 6-pr.	2	64	150
Hull	Wilmington	1902	244 0	24 6	6 0	2	408	9,119	28·04	2 14-pr., 5 6-pr.	2	64	150
Lawrence.. ..	Quincy, Mass.	1900	242 3	22 3	6 2	2	400	8,400	28·41	2 14-pr., 5 6-pr.	2	64	115
Macdonough ..	Quincy, Mass.	1901	242 3	22 3	6 2	2	400	8,400	28·03	2 14-pr., 5 6-pr.	2	64	115
Paul Jones ..	San Francisco	1900	215 0	23 7	6 6	2	420	8,000	28·91	2 14-pr., 5 6-pr.	2	64	139
Perry	San Francisco	1900	215 0	23 7	6 6	2	420	7,950	28·32	2 14-pr., 5 6-pr.	2	64	139
Preble	San Francisco	1901	215 0	23 7	6 6	2	420	7,370	28·03	2 14-pr., 5 6-pr.	2	64	139
Stewart	Morris Heights	1902	215 0	23 7	6 6	2	420	8,000	29·69	2 14-pr., 5 6-pr.	2	64	139
Truxtun	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	29·58	2 14-pr., 5 6-pr.	2	64	232
Whipple	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	28·24	2 14-pr., 5 6-pr.	2	64	232
Worden	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	29·86	2 14-pr., 5 6-pr.	2	64	232

* Parsons turbines. † Curtis turbines. ‡ Zoelly turbines.
§ Guns of destroyers of this class are Driggs Semi-Automatic Quick-Firers.

United States—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament. Guns.	Torpedo Tubes.	Complement.	Maximum Coal Capacity.
DESTROYERS—*continued.*			ft. in.	ft. in.	ft. in.		Tons.		Knots.				
Beale..													
Fanning													
Henley	Quincy, Mass.	1911	289 0	26 1½	8 4	3	900	12,000*	29·50	5 3-in., 2 M.	3 18-in.	89	210
Jarvis													
Jewett													
SEA-GOING—													
Bagley	Bath	1900	157 0	17 0	4 7	2	167	4,200	29·15	3 3-pr.	3	29	..
Bailey	Morris Heights	1899	205 0	19 0	6 0	2	235	5,600	30·20	4 6-pr.	2	..	20
Barney	Bath	1900	157 0	17 0	4 7	2	167	4,200	29·04	3 3-pr.	3	29	..
Biddle	Bath	1900	157 0	17 0	4 7	2	167	4,200	28·57	3 3-pr.	3	29	..
Blakely	Boston ..	1902	175 0	17 6	4 8	2	165	3,000	25·58	3 3-pr.	3	29	70
De Long	Boston ..	1901	175 0	17 6	4 8	2	165	3,000	25·52	3 3-pr.	3	29	70
Du Pont	Bristol, R.I.	1897	175 0	17 8	4 8	2	165	..	28·58	4 1-pr.	3	32	76
Foote..	Baltimore ..	1896	160 0	16 1	5 0	2	142	2,000	24·53	3 1-pr.	3	24	44
Porter	Bristol, R.I.	1896	175 0	17 8	4 8	2	165	..	28·63	4 1-pr.	3	32	76
Rodgers	Baltimore ..	1896	160 9	16 1	5 0	2	142	2,295	24·49	3 1-pr.	3	24	44
Rowan	Seattle, Wash.	1898	170 0	17 0	5 11	2	182	3,200	27·07	4 1-pr.	3	32	60
Shubrick	Richmond ..	1899	175 0	17 6	4 8	2	165	3,375	26·07	3 3-pr.	3	29	70
Stockton	Richmond ..	1899	175 0	17 6	4 8	2	165	3,275	25·79	3 3-pr.	3	29	70
Tingey	Baltimore ..	1902	175 0	17 6	4 8	2	165	3,000	24·94	3 3-pr.	3	29	70
Wilkes	Morris Heights	1901	175 0	17 6	4 8	2	165	3,495	25·99	3 3-pr.	3	29	70
Winslow	Baltimore ..	1897	160 0	16 1	5 0	2	142	2,000	24·82	3 1-pr	3	24	44
Cushing	Bristol, R.I.	1890	138 9	14 3	4 11	2	105	1,720	22·50	3 1-pr.	3	23	36
Dahlgren	Bath	1899	147 0	16 4	4 7	2	146	4,200	30	4 1-pr.	2	..	32
Davis	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	23·41	3 1-pr.	3	..	..
Ericsson	Dubuque, Iowa	1894	149 7	15 6	4 9	2	120	1,800	24	4 1-pr.	3	23	35
Farragut	San Francisco	1898	213 6	20 8	6 0	2	273	5,878	30·13	4 6-pr.	2	..	76
Fox	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	23·13	3 1-pr.	3	..	..
Goldsborough ..	Portland, Ore.	1902	194 8	20 5	5 0	2	247·5	6,000	27·40	4 6-pr.	2	..	131
Morris	Bristol, R.I.	1898	138 3	15 6	4 1	2	105	1,750	24	3 1-pr.	3	..	28
Somers	Schichau, Elbing ..	1898	149 3½	17 5	..	2	145	1,900	17·5	..	..	..	..
Stringham ..	Wilmington	1899	225 0	22 0	6 6	2	340	7,200	25·33	7 6-pr.	2	..	120
T. A. M. Craven	Bath	1899	147 0	16 4	4 7	2	146	4,260	30	4 1-pr.	2	..	32
Thornton	Richmond	1900	175 0	17 6	4 8	2	165	3,000	24·88	3 3-pr.	3	29	70
THIRD CLASS—													
Gwin..	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	20·88	1 1-pr.	2	..	8
Mackenzie ..	Philadelphia	1898	99 3	12 9	4 3	1	65	850	20	1 1-pr.	2	..	15·3
McKee	Philadelphia	1898	99 3	12 9	4 3	1	65	850	19·82	2 1-pr.	2	..	..
Talbot	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	21·15	1 1-pr.	2	..	8·8
SUBMARINE—													
A1	Elizabethport	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
A2	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
A3	San Francisco	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
A4	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
A5	San Francisco	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
A6	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
A7	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
B1	Quincy, Mass.	1909											
B2	Quincy, Mass.	1906	80 6	13 0	..	..	170		8½—10				
B3	Quincy, Mass.	1909											
C1	Quincy, Mass.	1906	106 0	..	..	..	273						
C2		1909											
C3		1909	..	..	..	..	239–274	500	..	..	2	..	..
C4		1909											
C5	Quincy, Mass.	1909											
D1		1909											
D2		1909	..	..	..	..	278–340	..	..	..	4	..	..
D3		1909											
E1	Quincy, Mass.												
E2													
F1	San Francisco												
F2													
F3	Seattle ..												
F4		Bldg.	160·0	13 0	..	..	525	..	9½—11	..	6	..	..
G1	Newport News	1911											
G2													
G3	..												
G4	Philadelphia												
H1, 2, 3†	..	1910											
K5, 6, 7, 8 ..	Quincy, &c...	Bldg.	..	..	..	..	500	..	22	..	..	..	..

Destroyers Alwin, Balch, Benham, Cassin, Cummings, Downes, Duncan, Parker, provided for 1911; 1040 tons, 16,000 H.P., 29½ knots, five 4-in. guns.

* Parsons turbines. † Sub-surface destroyers.

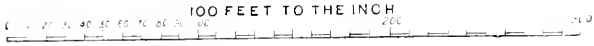
PLANS

OF

BRITISH AND FOREIGN SHIPS.

SCALE FOR PLATES.

100 FEET TO THE INCH

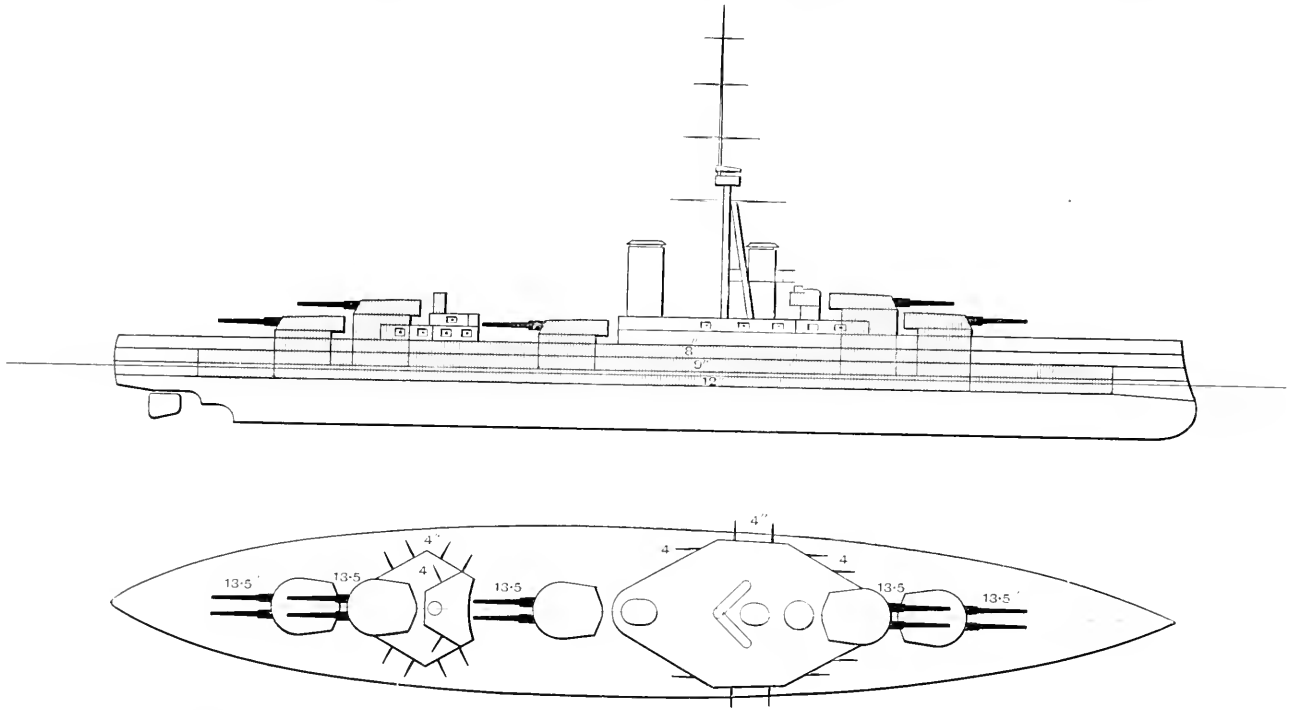


h

GREAT BRITAIN.

BATTLESHIPS.

Orion. Conqueror. Monarch. Thunderer. Ajax. Audacious. Centurion. King George V.



Orion . . . . } Conqueror . . } Monarch . . } Thunderer . . } Length, 545 ft. ; 22,500 tons ; Speed, 21 knots ; Building ; Armament, 10—13·5 in., 16—4 in.

Ajax . . . . } Audacious . . } Centurion . . } King George V. } Length, 555 ft. ; 23,000 tons ; Speed, 21 knots ; Building ; Armament, 10—13·5 in., 16—4 in.

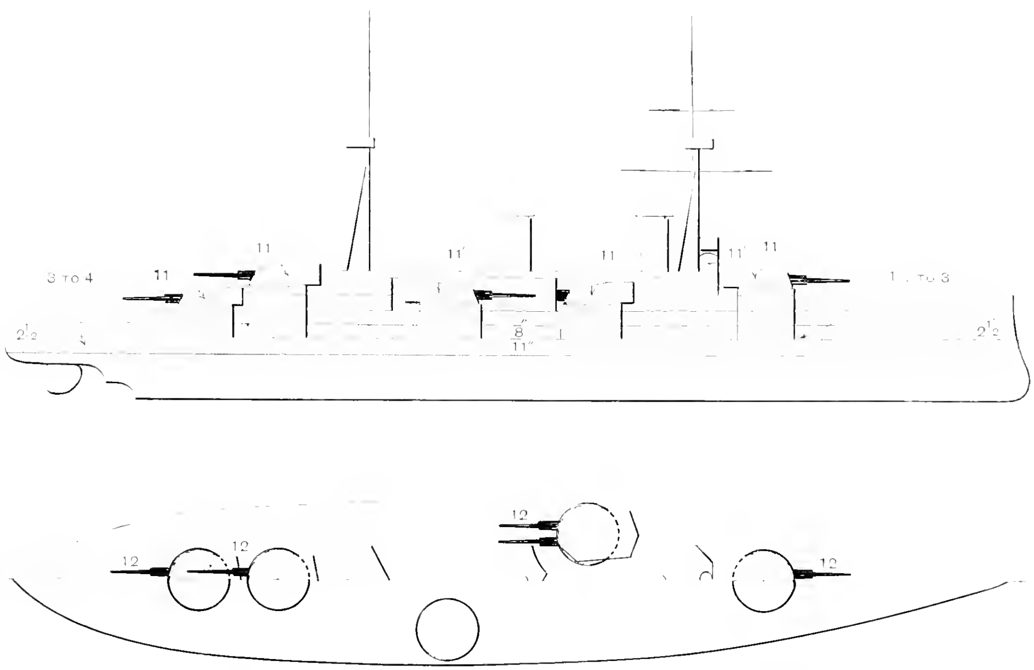
See page 183.

PLATE 1.

GREAT BRITAIN.

BATTLESHIPS.

Neptune. Hercules. Colossus.



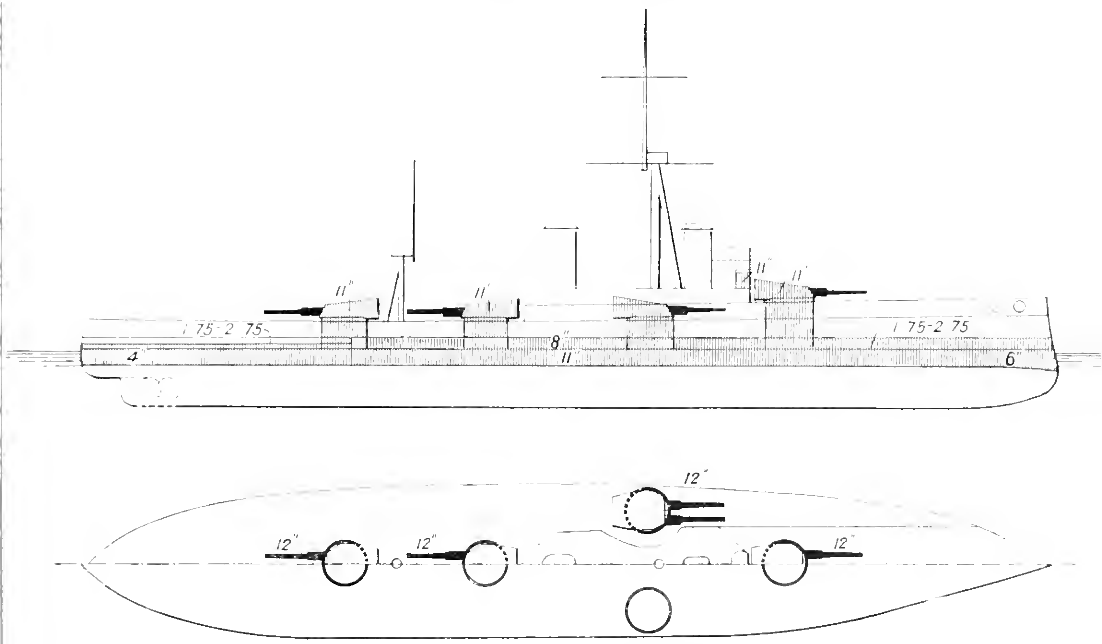
Length, 510 ft.; 19,900–20,000 tons; Speed, 21·5–21·78 knots; Completed, 1911;
Armament, 10—12 in., 16—4 in.

See page 183.

GREAT BRITAIN.

BATTLESHIPS.

Dreadnought. Bellerophon. St. Vincent. Temeraire. Vanguard. Superb. Collingwood.



Dreadnought.—Length, 490 ft.; 17,900 tons; Speed, 21·8 knots; Completed, 1906; Armament, 10—12 in., 24—12 pr.

Bellerophon, Temeraire, Superb.—Length, 490 ft.; 18,600 tons; Speed, 21·6–22 knots; Completed, 1909; Armament, 10—12 in., 16—4 in.

Collingwood, St. Vincent, Vanguard.—Length, 500 ft.; 19,250 tons; Speed, 21·5–22·1 knots; Completed, 1910; Armament, 10—12 in., 20—4 in.

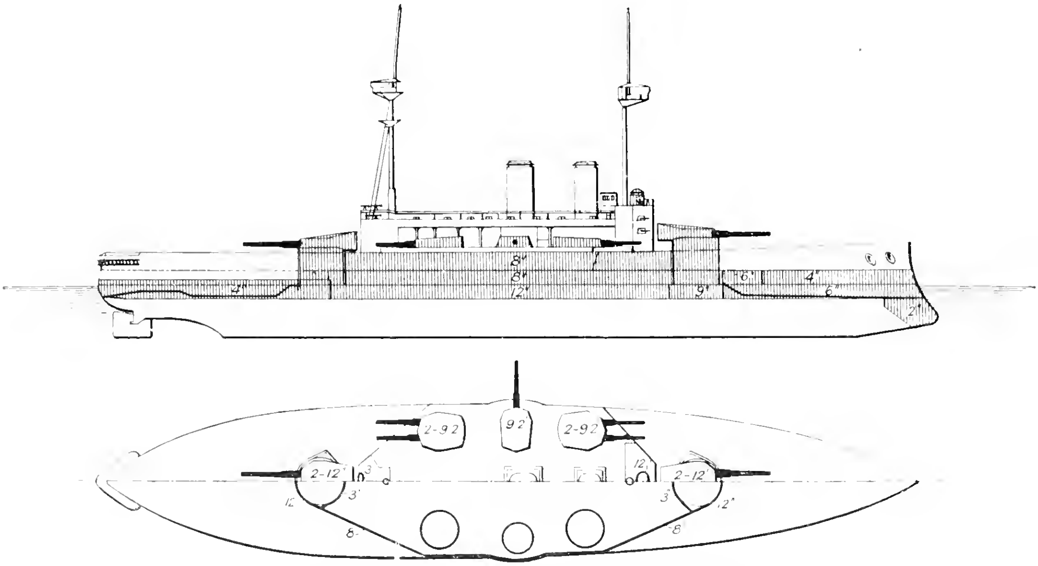
N.B. The masts are differently arranged in the later ships.

See page 180.

GREAT BRITAIN.

BATTLESHIPS.

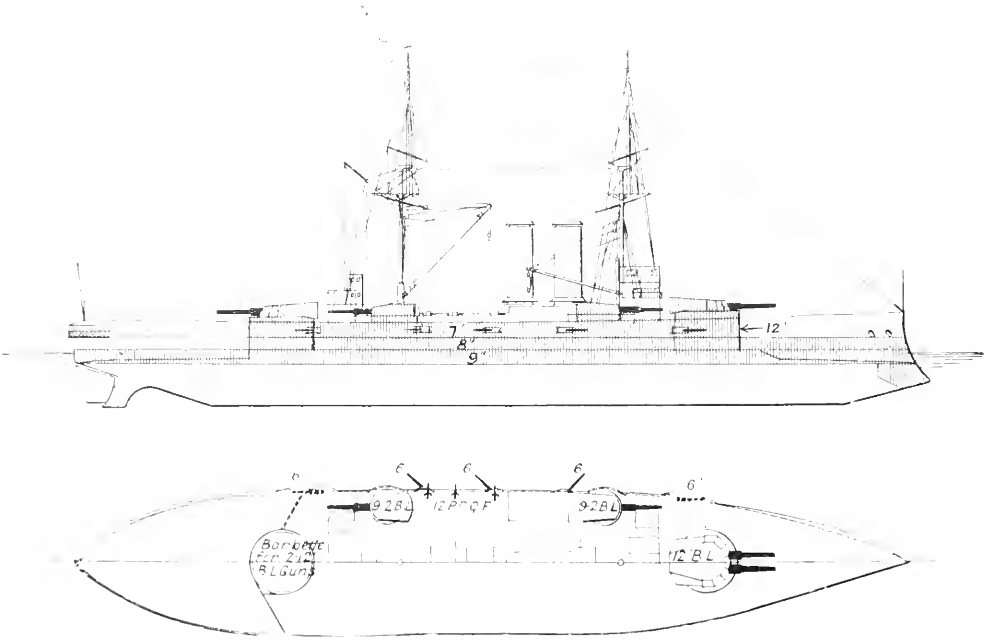
Lord Nelson. **Agamemnon.**



Length, 410 ft. ; 16,500 tons ; Speed, 18·75–18·9 knots ; Completed, 1908 ;
Armament, 4—12 in., 10—9·2 in., 24—12 pr., 5 small.

See page 183.

King Edward VII. **Africa.** **Britannia.** **Commonwealth.** **Dominion**
Hibernia. **Hindustan.** **New Zealand.**



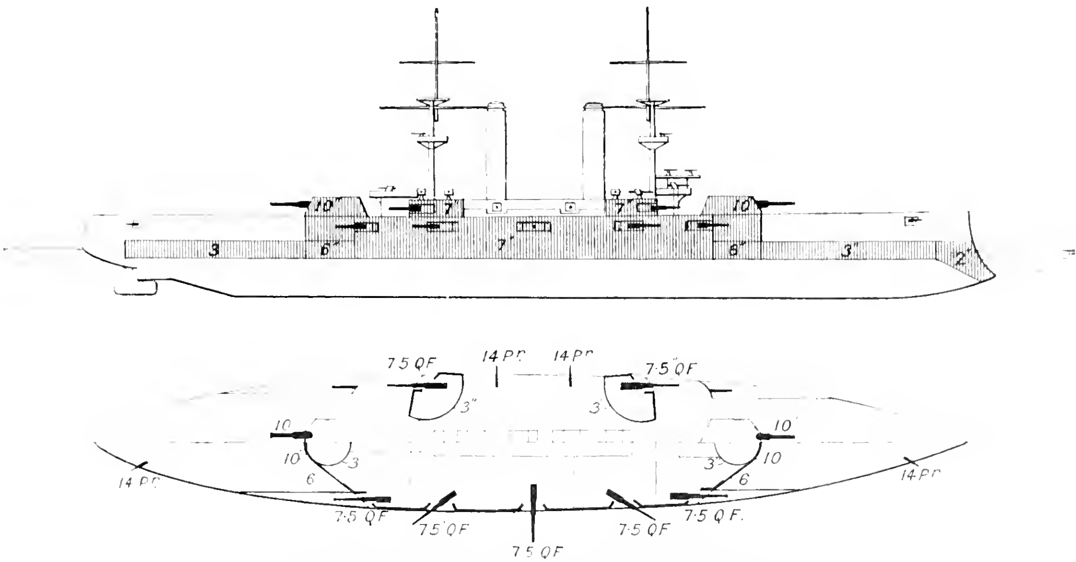
Length, 425 ft. ; 16,350 tons ; Speed, 18·5–19·5 knots ; Completed, 1905-1906 ;
Armament, 4—12 in., 4—9·2 in., 10—6 in., 14—12 pr., 17 small.

See page 182.

GREAT BRITAIN.

BATTLESHIPS.

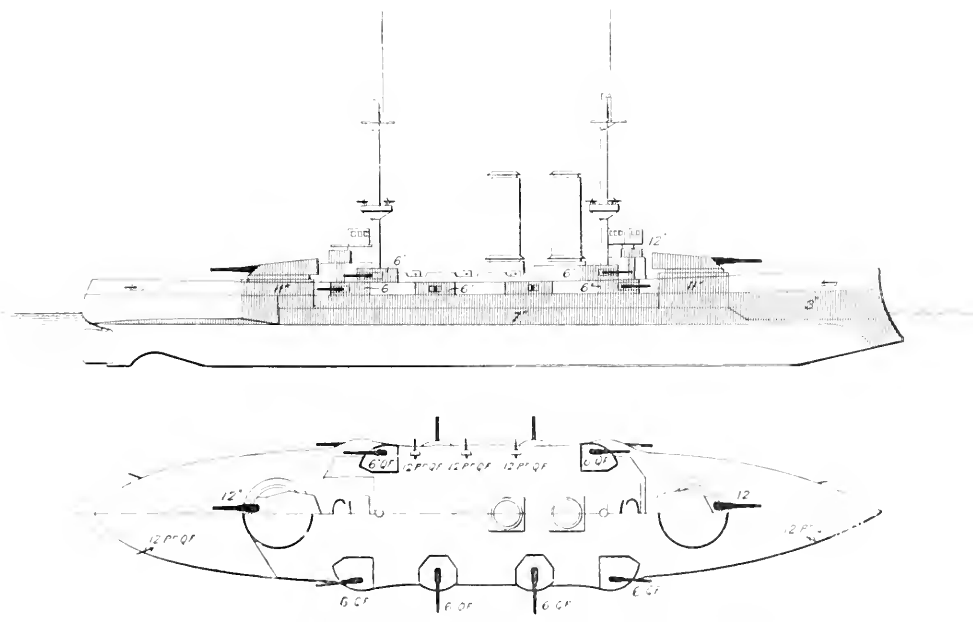
Triumph. **Swiftsure.**



Length, 436 ft.; 11,800 tons; Speed, 19·6 knots; Completed, 1904;
Armament, 4—10 in., 14—7·5 in., 14—14 pr., 2—12 pr., 8 small.

See page 185.

Duncan. **Albemarle.** **Cornwallis.** **Exmouth.** **Russell.**



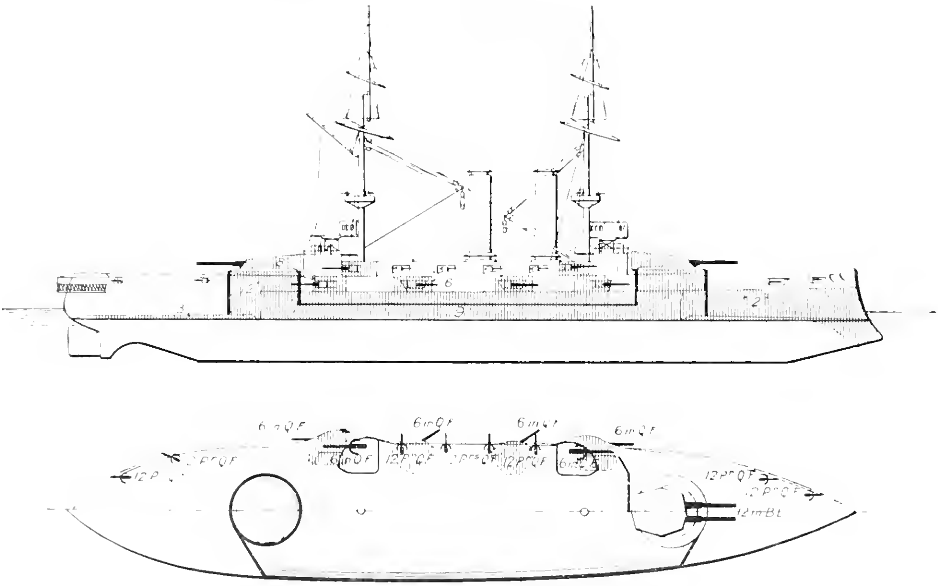
Length, 405 ft.; 14,000 tons; Speed, 18·6—19·3 knots; Completed, 1903–1904;
Armament, 4—12 in., 12—6 in., 12—12 pr., 8 small.

See page 184.

GREAT BRITAIN.

BATTLESHIPS.

Formidable. ***Bulwark.** ***Prince of Wales.** **Implacable.** ***Queen.** **Irresistible.** ***Venerable.** ***London.**

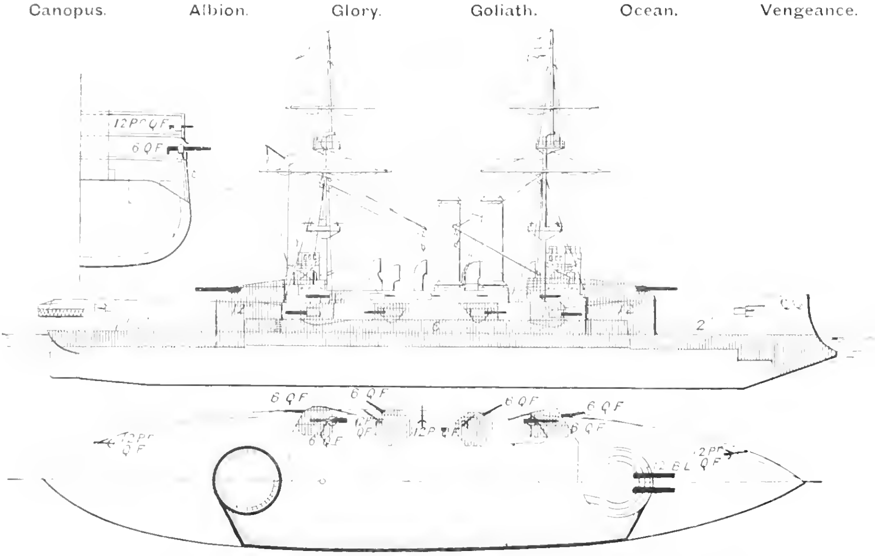


*In These Ships 9" Armour Tapers to 2" at 30 ft From Bow & They Have no Forward Bulkhead

Length, 400 ft. ; 15,000 tons ; Speed, 18—18·3 knots ; Completed, 1901–1904 ;
Armament, 4—12 in., 12—6 in., 18—12 pr., 8 small.

See page 181.

Canopus. **Albion.** **Glory.** **Goliath.** **Ocean.** **Vengeance.**



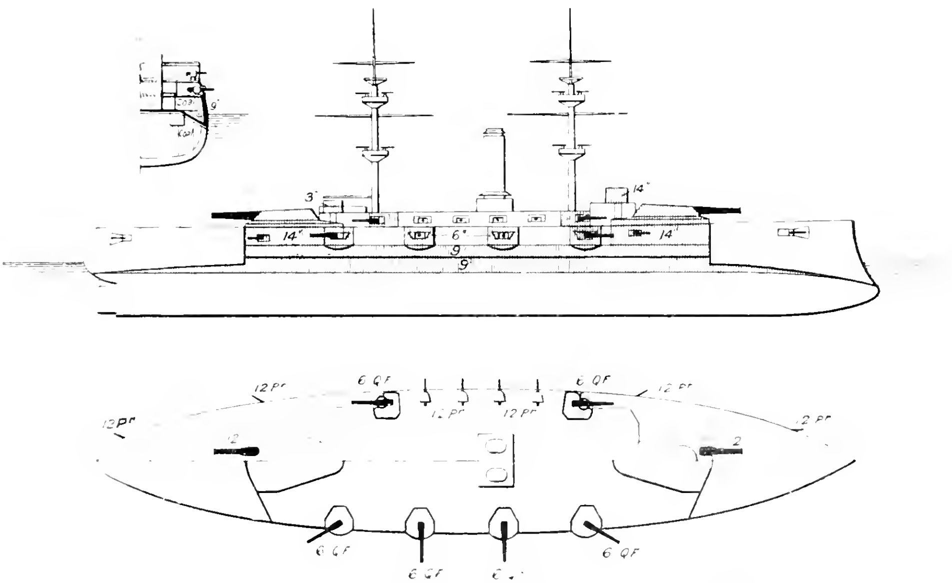
Length, 390 ft. ; 12,950 tons ; Speed, 18·2—18·5 knots ; Completed, 1900–1902 ;
Armament, 4—12 in., 12—6 in., 12—12 pr., 8 small.

See page 179.

GREAT BRITAIN.

BATTLESHIPS.

Majestic. Cæsar. Mars. Hannibal. Prince George. Illustrious. Jupiter. Victorious. Magnificent



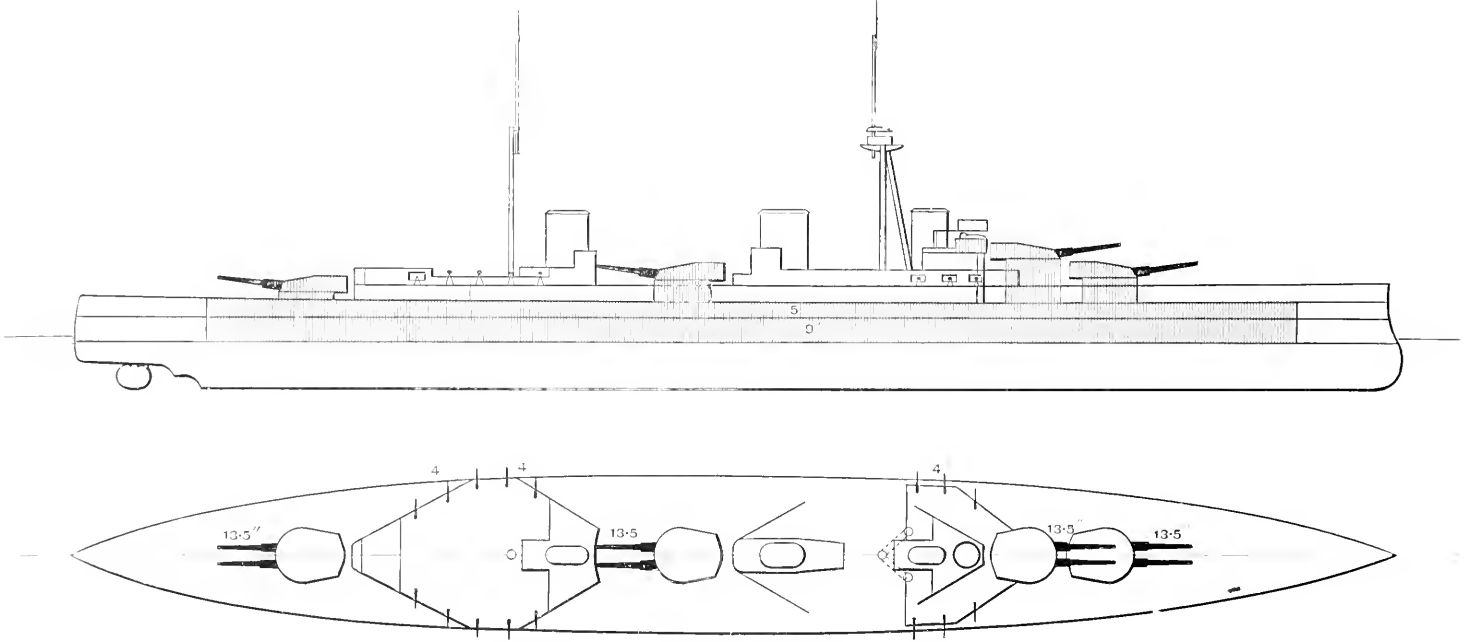
Length, 390 ft. ; 14,900 tons ; Speed, 17·5 knots ; Completed, 1895-1898.
Armament, 4—12 in., 12—6 in., 18—12 pr., 10 small.

See page 183.

GREAT BRITAIN.

ARMOURED CRUISERS.

Lion. Princess Royal. Queen Mary.



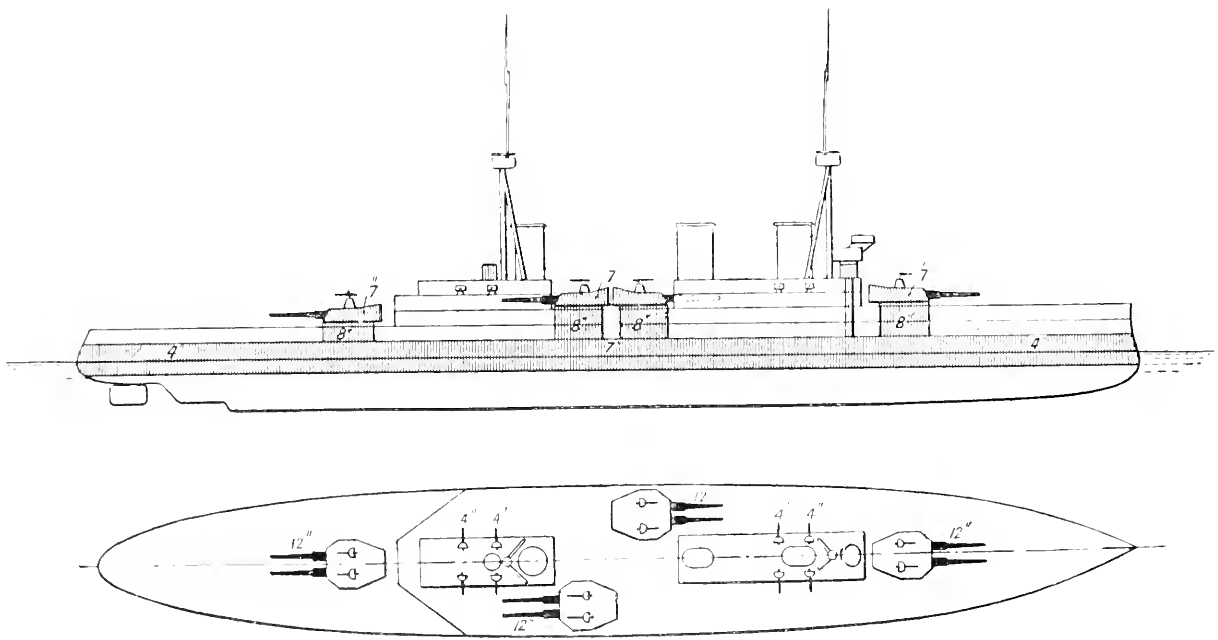
Length 660 ft.; 26,350–27,000 tons; Speed, 28 knots; Building; Armament, 8—13·5 in., 16—4 in.

See page 183.

GREAT BRITAIN.

ARMOURED CRUISERS.

Invincible. Indomitable. Inflexible. Indefatigable.*



Invincible }
Indomitable } Length, 530 ft. ; 17,250 tons ; Speed, 26 knots ; Completed, 1908–9 ; Armament, 8–12 in., 16–4 in.
Inflexible }

Indefatigable* : Length, 555 ft. ; 18,750 tons ; Speed, 25 knots ; Completed, 1911 ; Armament, 8–12 in., 16–4 in.

* The centre turrets are more *en échelon* than in the three earlier ships.

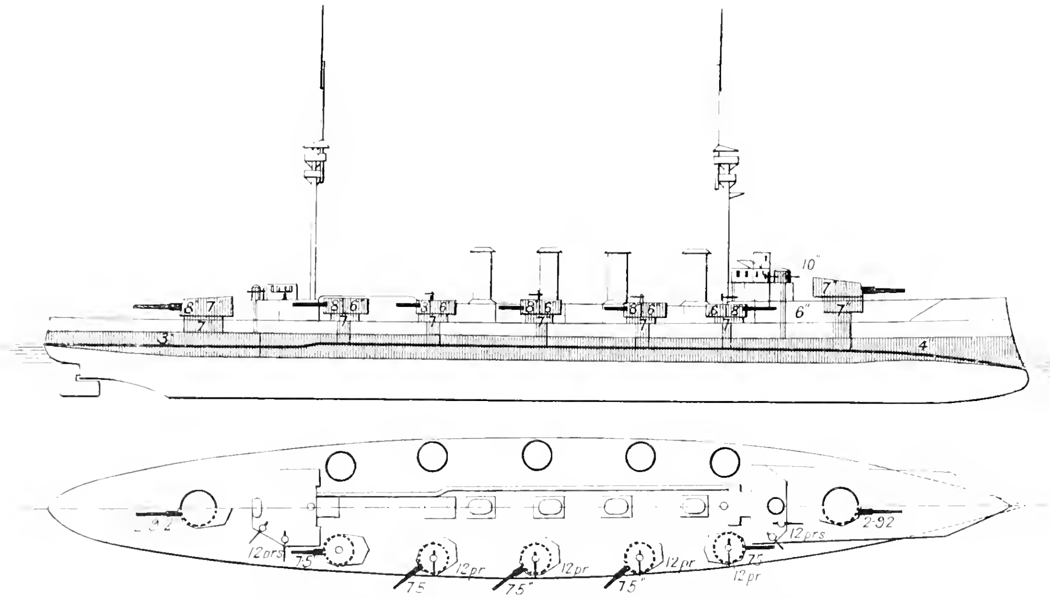
See page 182.

PLATE 9.

GREAT BRITAIN.

ARMOURED CRUISERS.

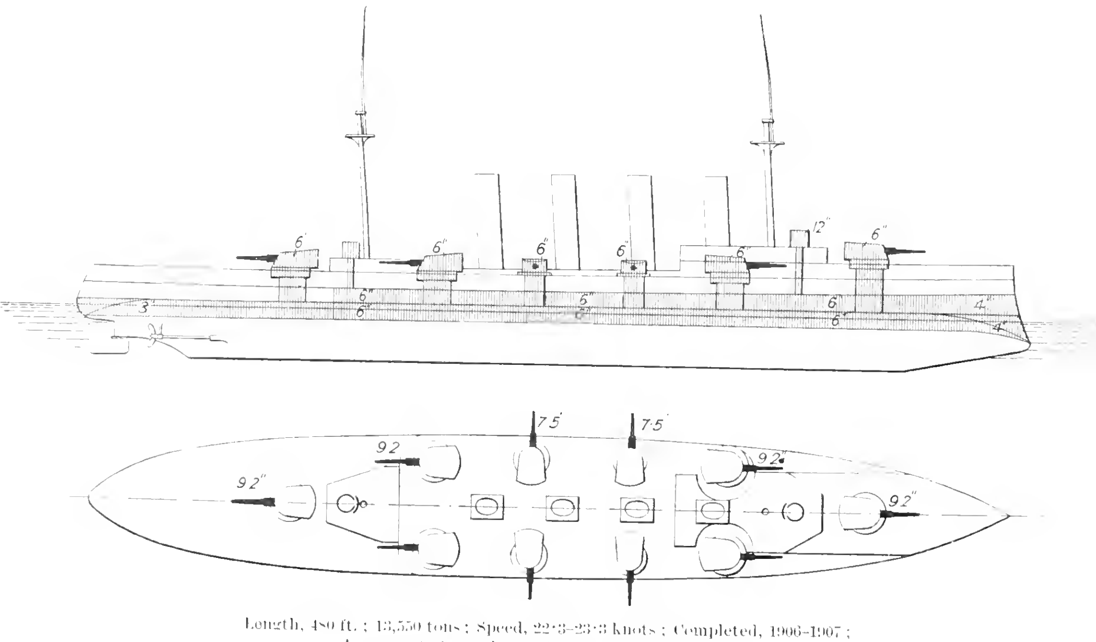
Defence. Minotaur. Shannon.



Length, 490 ft. ; 14,600 tons ; Speed, 22·5–23·5 knots ; Completed, 1907–1908 ;
Armament, 4—9·2 in., 10—7·5 in., 16—12 pr., 5 small.

See page 180.

Achilles. Cochrane. Natal. Warrior.



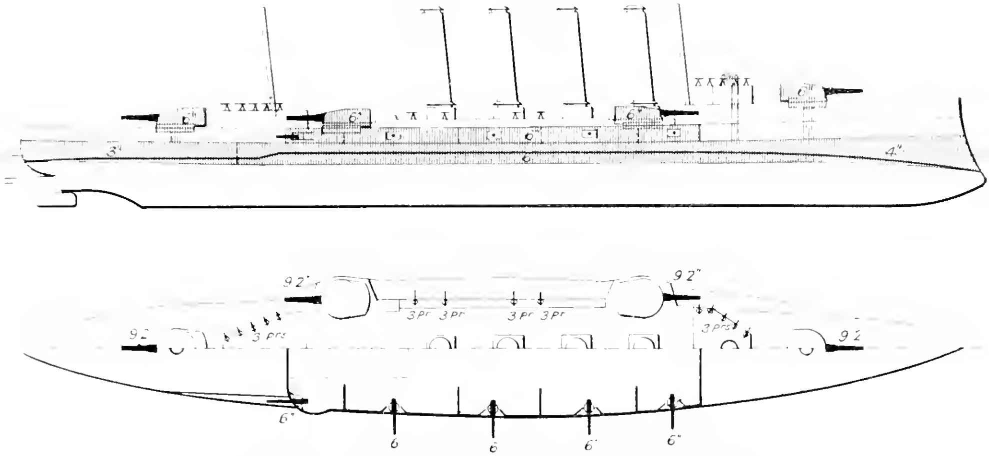
Length, 480 ft. ; 13,550 tons ; Speed, 22·3–23·3 knots ; Completed, 1906–1907 ;
Armament, 6—9·2 in., 4—7·5 in., 1—12 pr., 31 small.

See page 178.

GREAT BRITAIN.

ARMOURED CRUISERS.

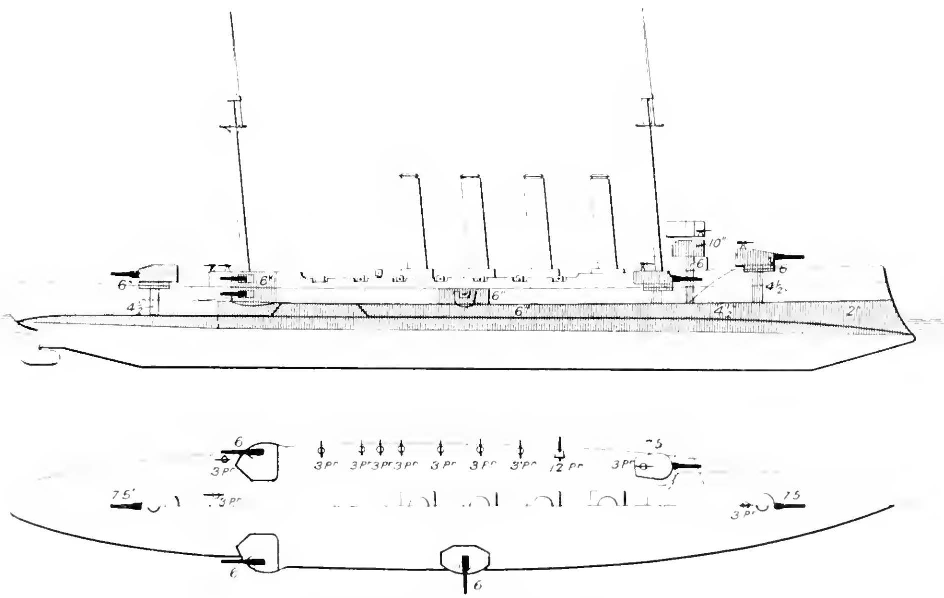
Black Prince. Duke of Edinburgh.



Length, 480 ft.; 13,550 tons; Speed, 22·8–23·6 knots; Completed, 1906;
Armament, 6—9·2 in., 10—6 in., 2—12 pr., 27 small.

See page 179.

Devonshire. Antrim. Argyll. Carnarvon. Hampshire. Roxburgh.



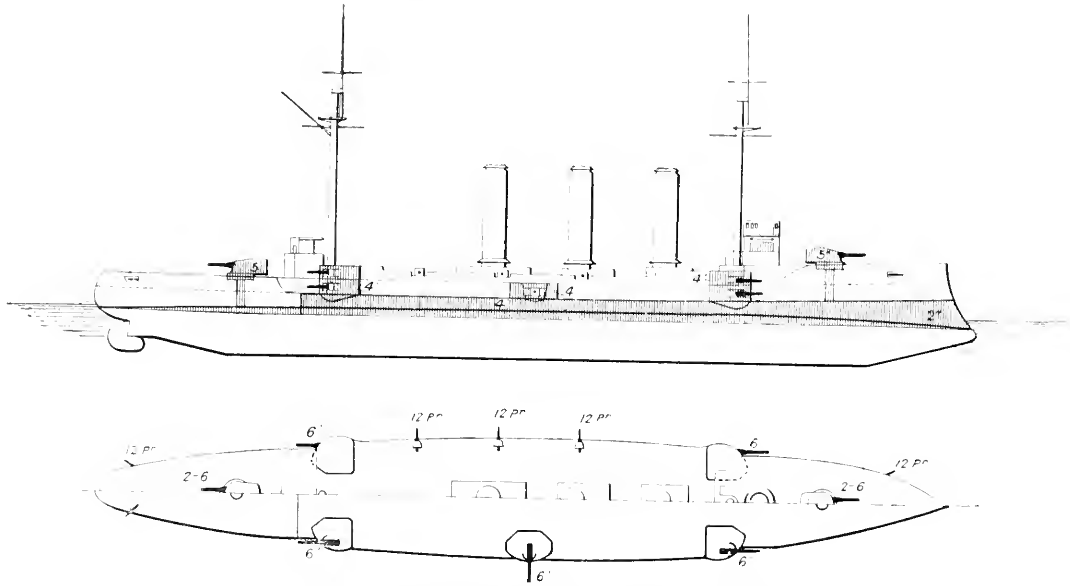
Length, 450 ft.; 10,850 tons; Speed, 22·2–23·6 knots; Completed, 1905–1906;
Armament, 4—7·5 in., 6—6 in., 1—12 pr., 24 small.

See page 180.

GREAT BRITAIN.

ARMOURED CRUISERS.

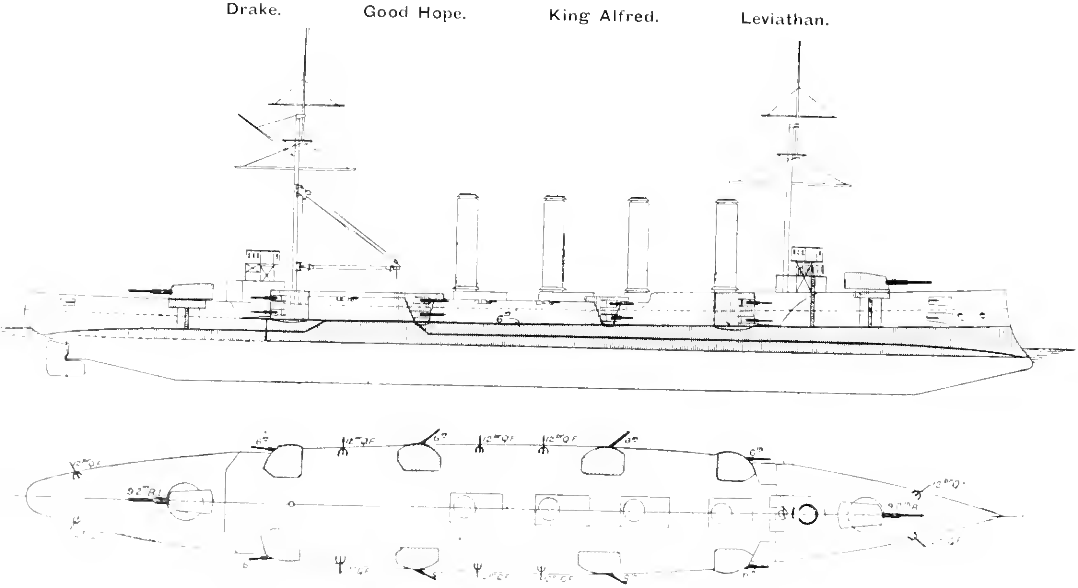
Berwick. Kent. Cornwall. Lancaster. Cumberland. Monmouth. Donegal. Suffolk. Essex.



Length, 440 ft. ; 9,800 tons ; Speed, 22·7–24·7½ knots ; Completed, 1903–1905 ;
Armament, 14—6 in., 10—12 pr., 9 small.

See page 179.

Drake. Good Hope. King Alfred. Leviathan.



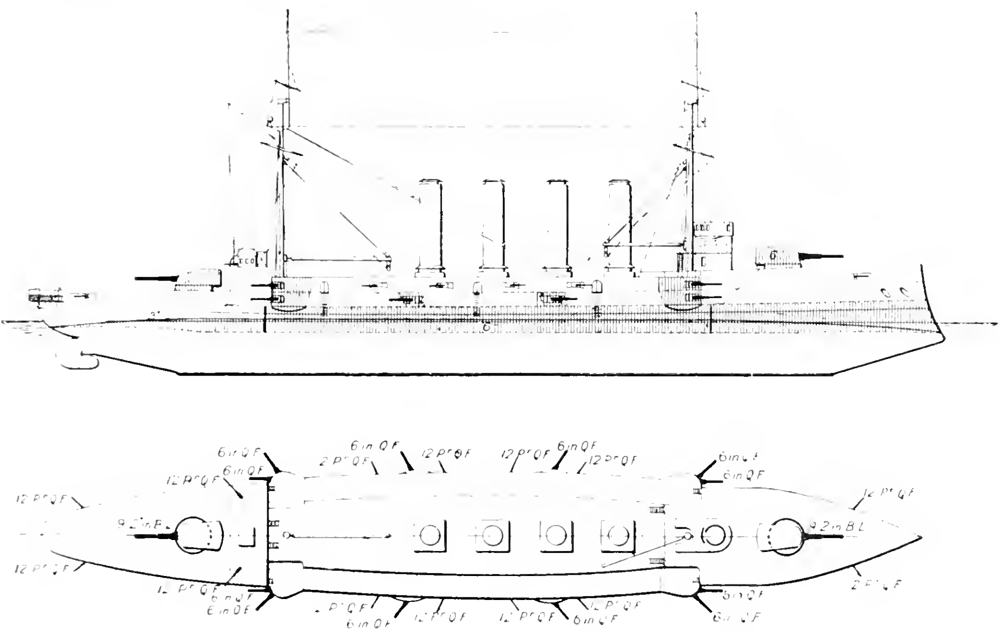
Length, 500 ft. ; 14,100 tons ; Speed, 23·3–24·1 knots ; Completed, 1902–1903 ;
Armament, 2—9·2 in., 16—6 in., 12—12 pr., 7 small.

See page 180.

GREAT BRITAIN.

ARMOURED CRUISERS.

Cressy. **Aboukir.** **Bacchante.** **Euryalus.** **Hogue.** **Sutlej.**



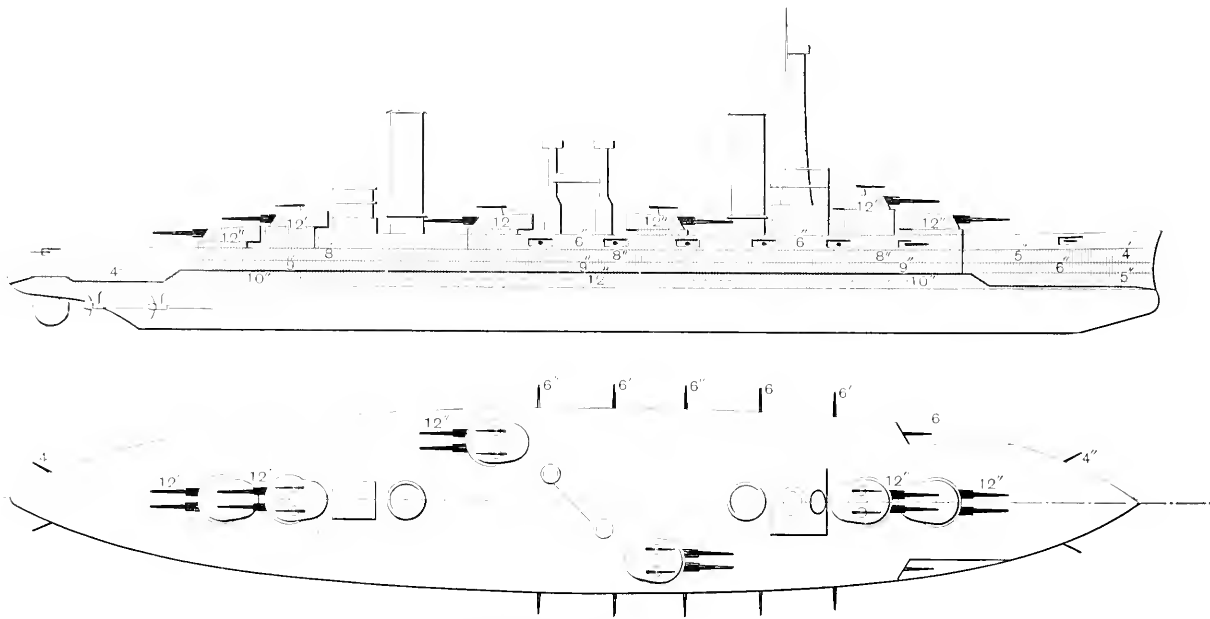
Length, 440 ft.; 12,000 tons; Speed, 20·8–21·8 knots; Completed, 1901-1904;
Armament, 2—9·2 in., 12—6 in., 14—12 pr., 15 small.

See page 180.

ARGENTINE.

BATTLESHIPS.

Moreno. **Rivadavia.**



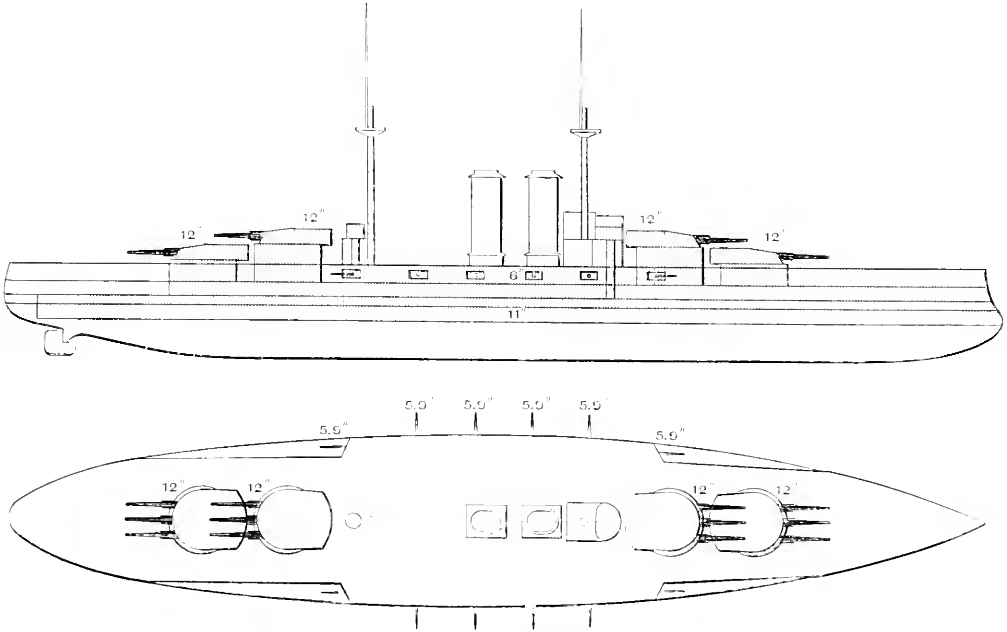
Length, 578 ft.; 28,000 tons; Speed, 22·5 knots; Building;
Armament, 12—12 in., 12—6 in., 12—4 in.

See page 194.

AUSTRIA.

BATTLESHIPS.

Viribus Unitis.



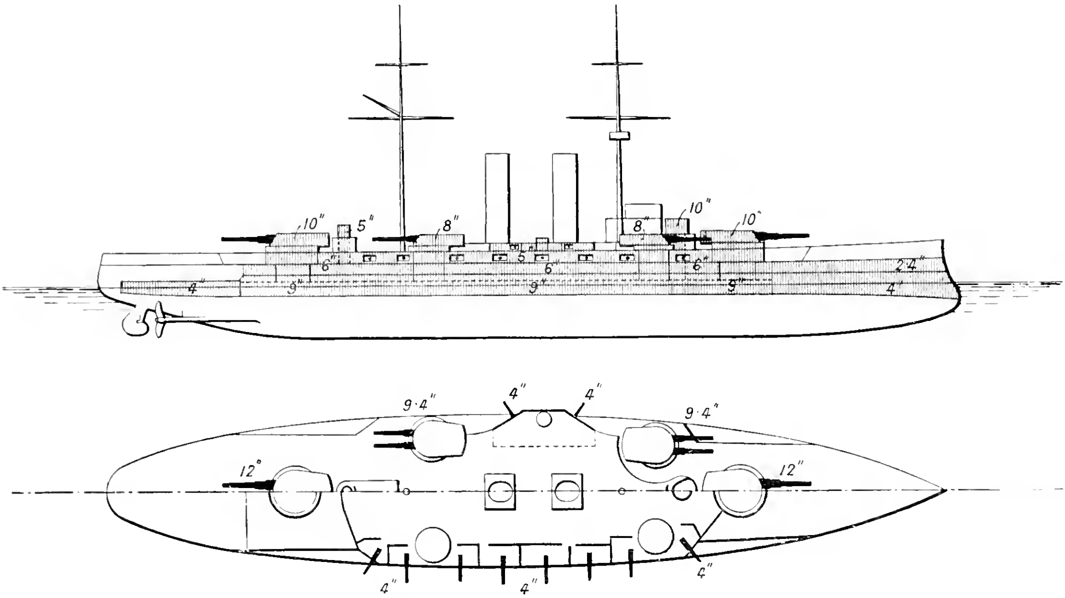
Length, 495 ft. ; 20,000 tons ; Speed, 20·5 knots ; Building ;
Armament, 12—12 in., 12—5·9 in., 18—12 pr.

See page 196.

AUSTRIA.

BATTLESHIPS.

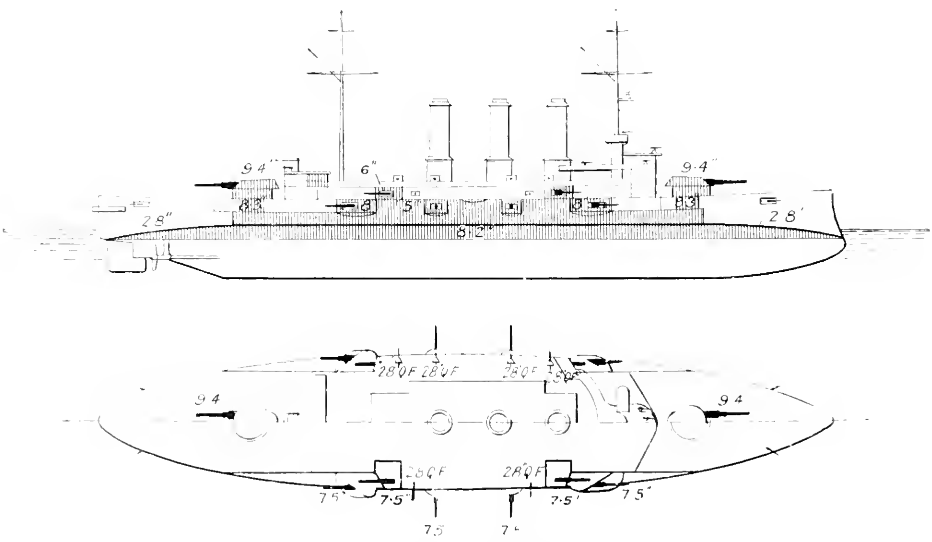
Erzherzog Franz Ferdinand. Radetzky. Zrinyi



Length, 451 ft. ; 14,226 tons ; Speed, 20·5 knots ; Erzherzog Franz Ferdinand and Radetzky, Completed, 1910 ; Zrinyi, Completed, 1911 ;
Armament, 4—12 in., 8—9·4 in., 20—4 in., 6—12 pr., 2 small.

See page 196.

Erzherzog Ferdinand Max. Erzherzog Karl. Erzherzog Friedrich.



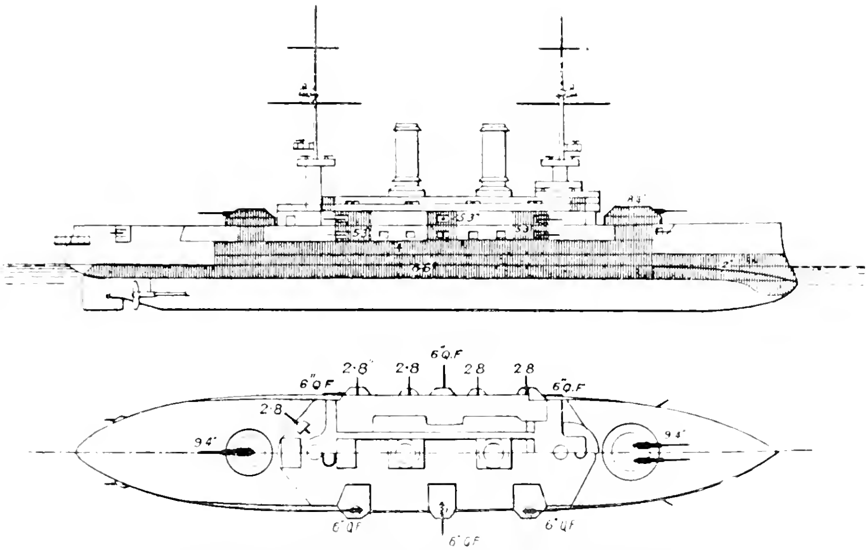
Length, 390 ft. ; 10,433 tons ; Speed, 20–20·6 knots ; Completed, 1906–1907 ;
Armament, 4—9·4 in., 12—7·5 in., 12—12 pr., 16 small.

See page 196.

AUSTRIA.

BATTLESHIPS

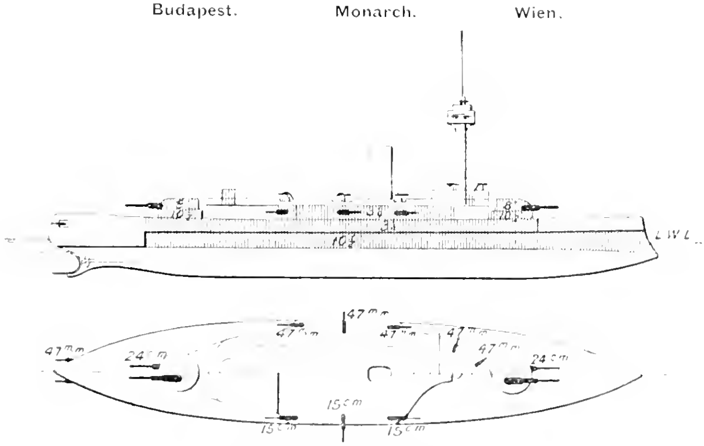
Arpad. **Babenberg.** **Habsburg.**



Length, 354 ft. ; 8208 tons ; Speed, 19·6 knots ; Completed, 1902-1904 ;
Armament, 3—9·4 in., 12—6 in., 10—12 pr., 10 small.

See page 19[illegible]

Budapest. **Monarch.** **Wien.**

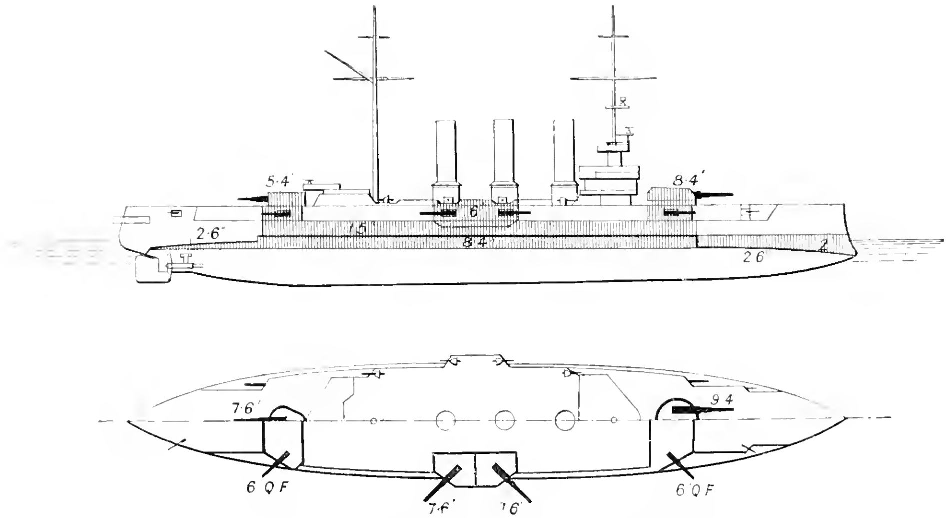


Length, 305 ft. ; 5402–5550 tons ; Speed, 17·5 knots ; Completed, 1897–189[illegible] ;
Armament, 4—9·4 in., 6—5·9 in., 24 small.

See page 196

ARMOURED CRUISERS.

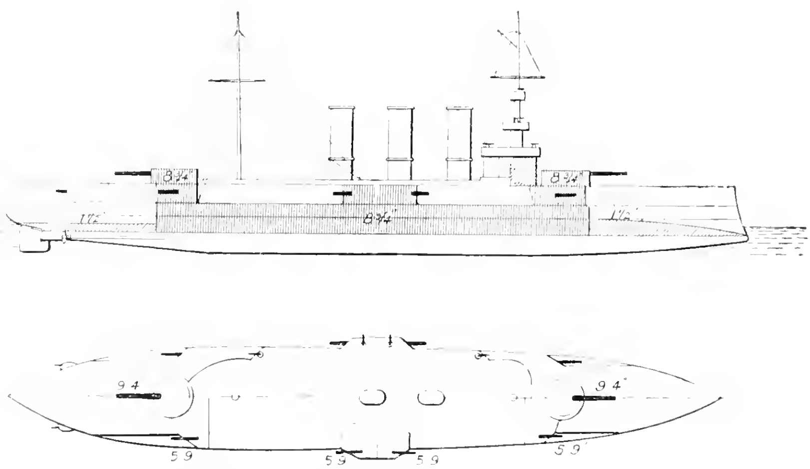
St. Georg.



Length, 384 ft. ; 7185 tons ; Speed, 22 knots ; Completed, 1906 ;
Armament, 2—9·4 in., 5—7·6 in., 4—6 in., 9—12 pr., 16 small.

See page 196.

Kaiser Karl VI.



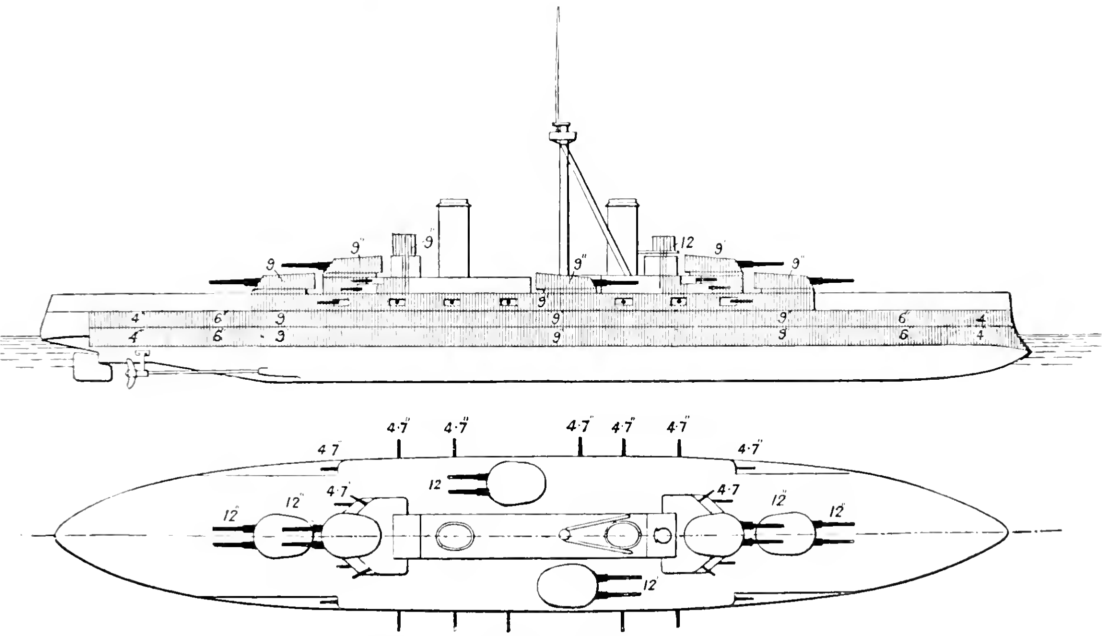
Length, 367 ft. ; 6151 tons ; Speed, 20·7 knots ; Completed, 1900 ;
Armament, 2—9·4 in., 8—5·9 in., 22 small.

See page 196.

BRAZIL.

BATTLESHIPS.

Minas Geraes. Sao Paulo.

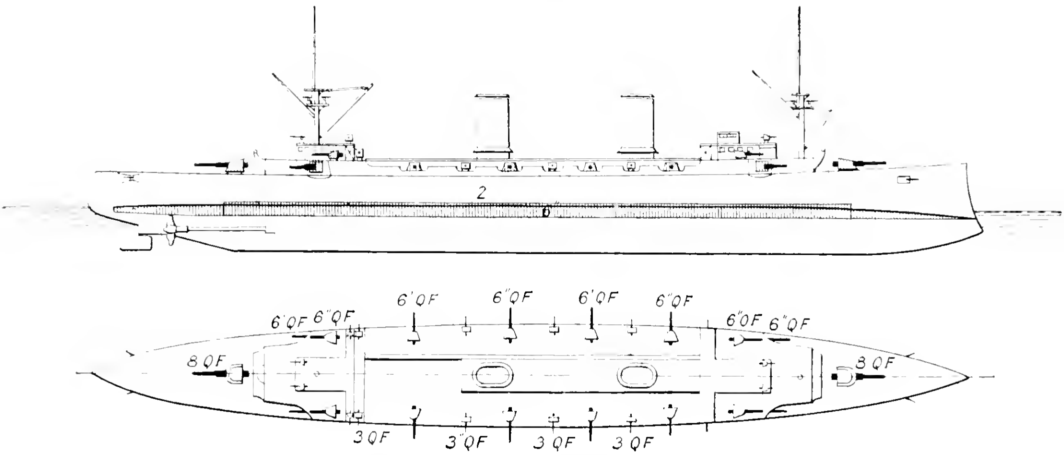


Length, 500 ft. ; 19,281 tons ; Speed, 21 knots ;
Minas Geraes, Completed, 1909 ; Sao Paulo, Completed, 1910.
Armament, 12—12 in., 22—4·7 in., 8 small.
Rio de Janeiro, building, will have 14—12-in., 20—6-in., 10 small.

See page 198.

ARMOURED CRUISER.

Esmeralda.



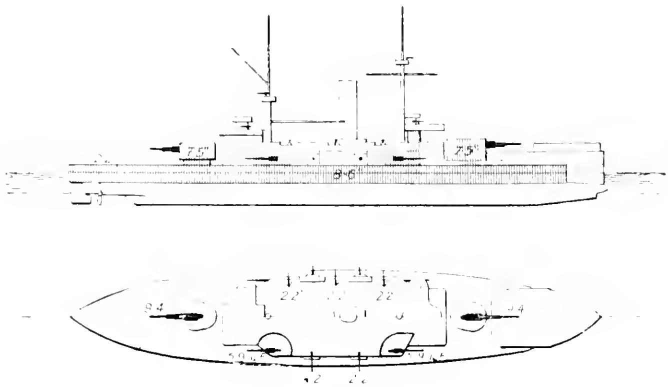
Length, 436 ft. ; 7020 tons ; Speed, 22·8 knots ; Completed, 1897 ;
Armament, 2—8 in., 16—6 in., 8—12 pr., 6 small.

See page 200.

DENMARK.

COAST DEFENCE SHIPS.

Herluf Trolle. Olfert Fischer. Peder Skram.



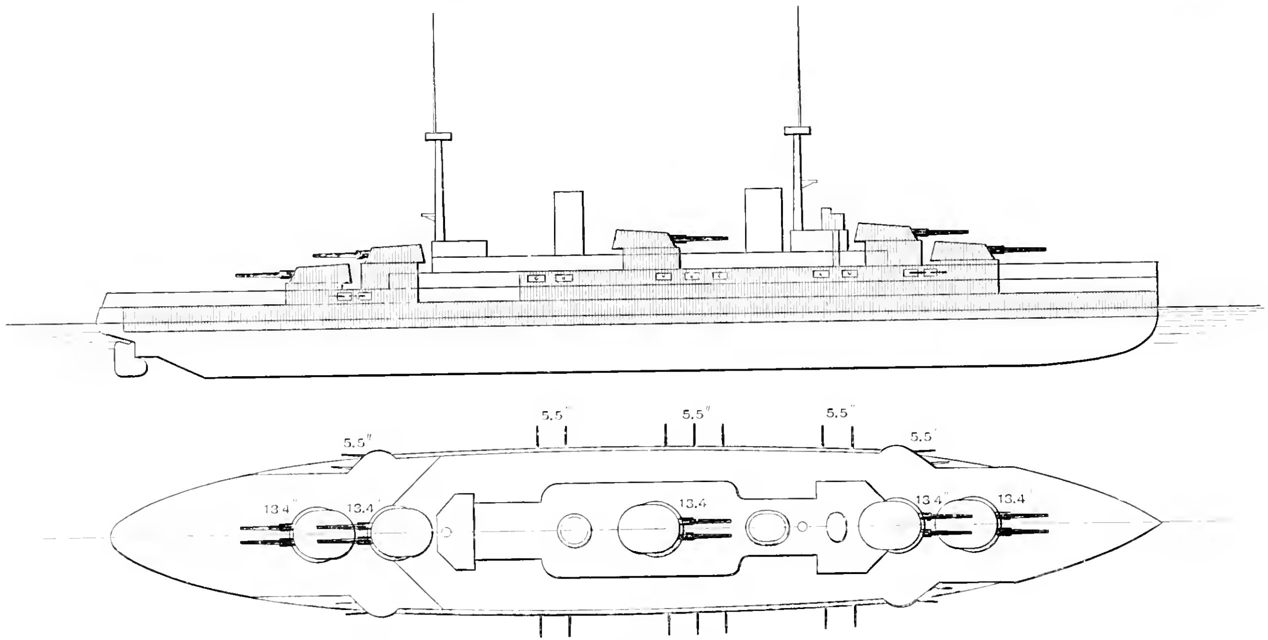
Length, 271-274 ft. ; 3415-3543 tons ; Speed, 16-16·5 knots ; Completed, 1901-1910 ; Armament, 2—9·4 in., 4—5·9 in., 18 small.

See page 202.

FRANCE.

BATTLESHIPS.

Bretagne. Provence. Lorraine.



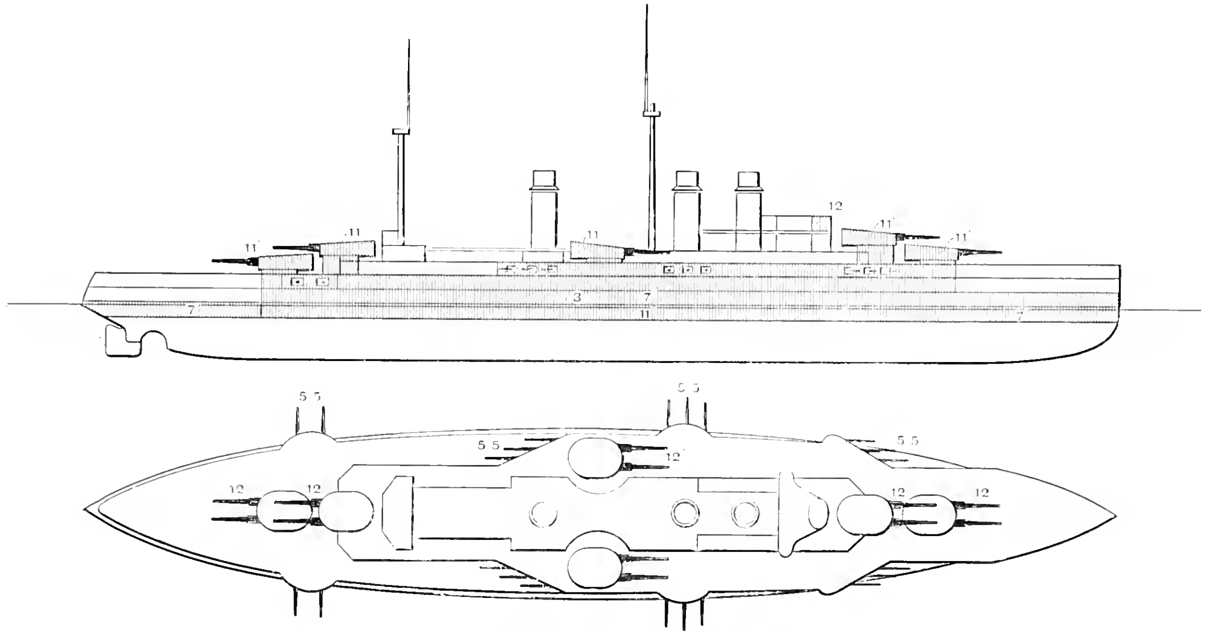
23,600 tons;
Armament, 10—13·4 in., 22—5·5 in.

See page 206.

FRANCE.

BATTLESHIPS.

Jean Bart. Courbet. France. Paris.



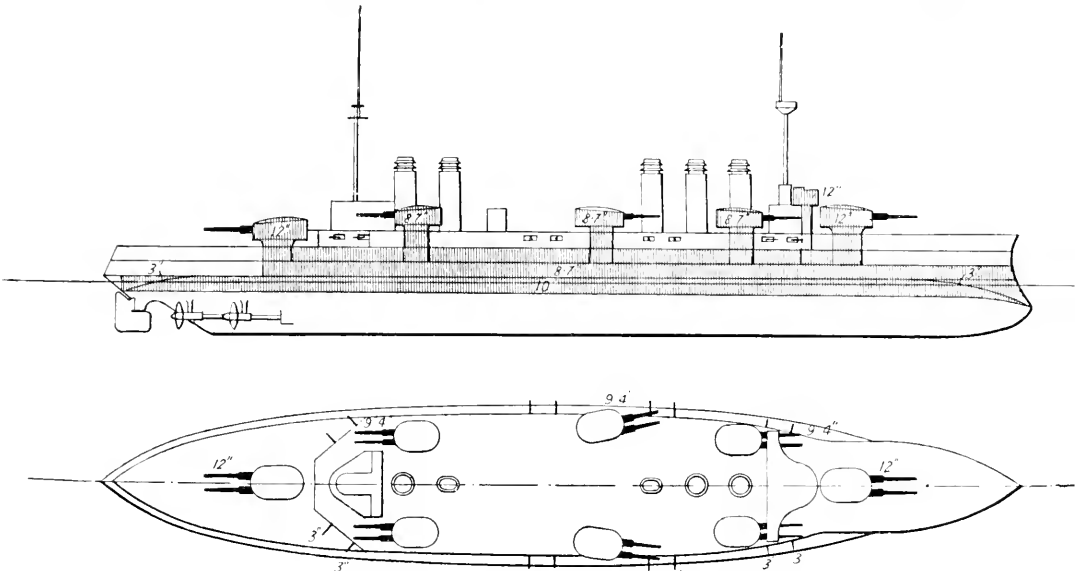
Length, 541 ft.; 23,096 tons; Speed, 20 knots; Building.
Armament, 12—12 in., 22—5·5 in.

See page 204.

FRANCE.

BATTLESHIPS.

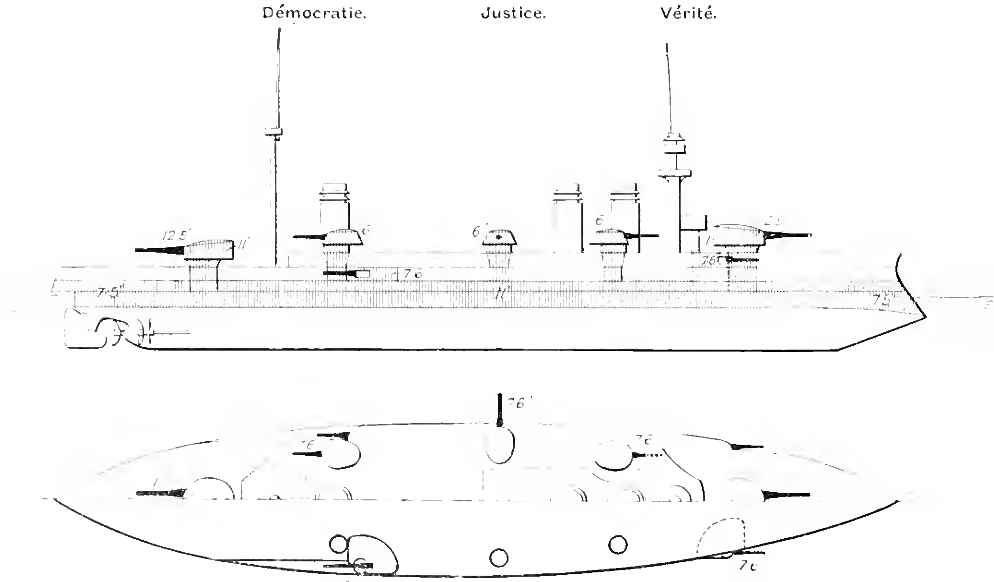
Condorcet. Danton. Diderot. Mirabeau. Vergniaud. Voltaire.



Length, 476 ft. ; 17,710 tons ; Speed, 19 knots ; Completed, 1911 ;
Armament, 4—12 in., 12—9·4 in., 16—12 pr., 10 small.

See page 203.

Démocratie. Justice. Vérité.



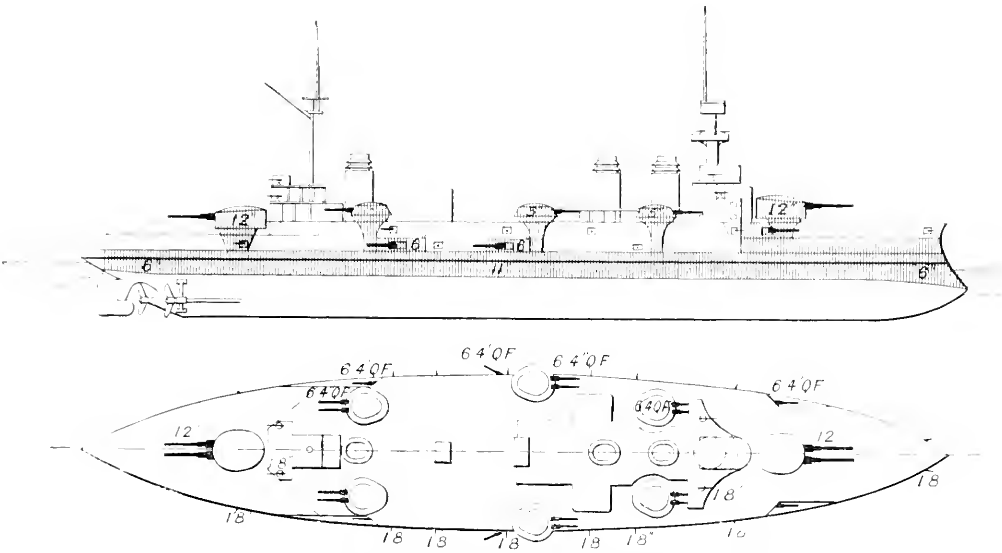
Length, 439 ft ; 14,635 tons ; Speed, 19·3 knots ; Completed, 1907–1908 ;
Armament, 4—12 in., 10—7·6 in., 28 small.

See page 205.

FRANCE.

BATTLESHIPS.

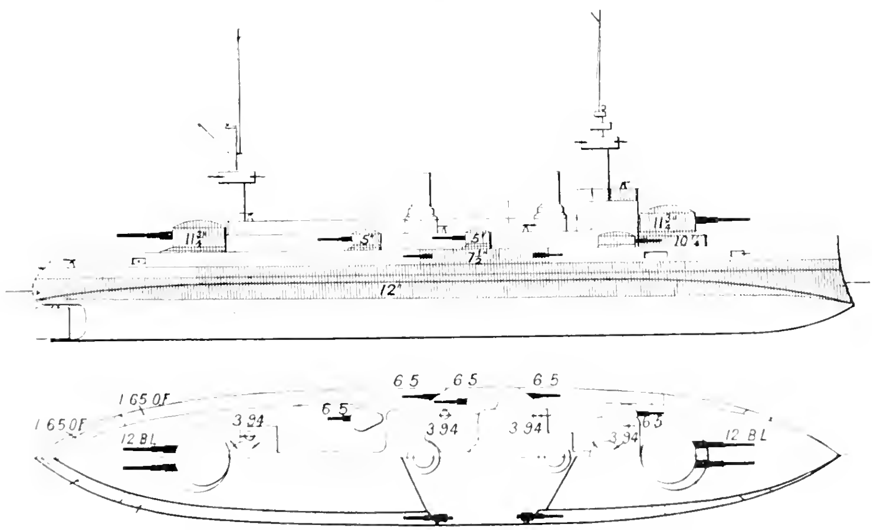
Patrie. République.



Length, 439 ft. ; 14,635 tons ; Speed, 19·1 knots ; Completed, 1906 ;
Armament, 4—12 in., 18—6·4 in., 28 small.

See page 205.

Suffren.



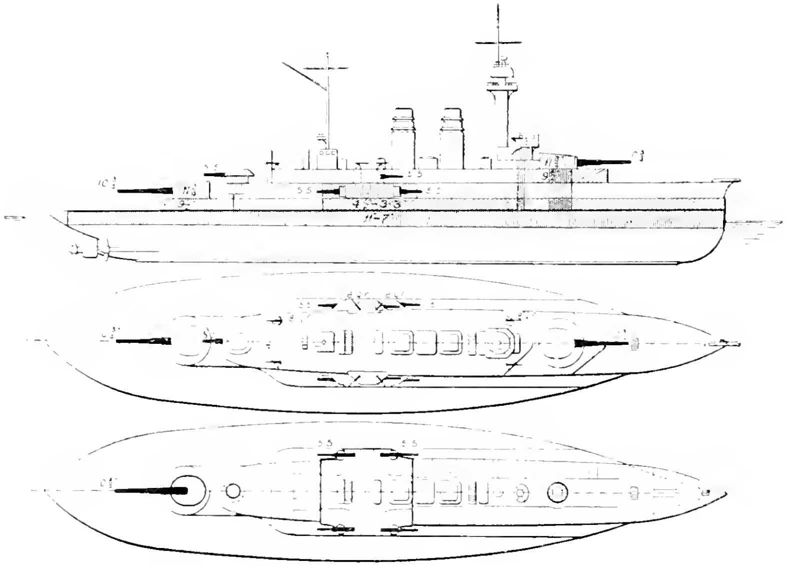
Length, 412 ft. ; 12,527 tons ; Speed, 18 knots ; Completed, 1903 ;
Armament, 4—12 in., 10—6·5 in., 8—3·9 in., 22 small.

See page 206.

FRANCE.

BATTLESHIPS.

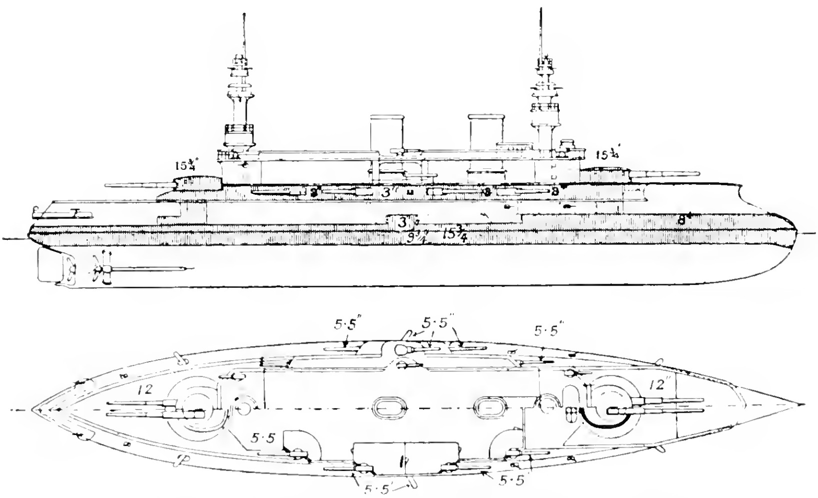
Henri IV.



Length, 354 ft.; 8807 tons; Speed, 17·2 knots; Completed, 1903;
Armament, 2—10·8 in., 7—5·5 in., 14 small.

See page 204.

Charlemagne. Gaulois. St. Louis.



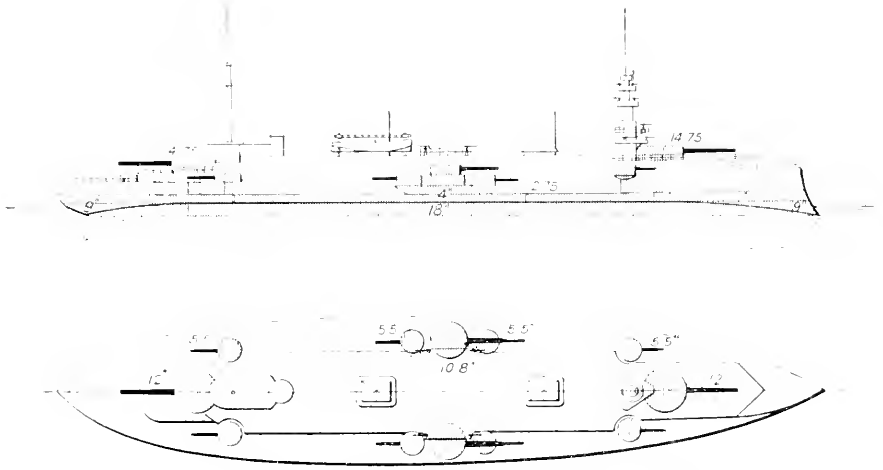
Length, 385 ft.; 11,108 tons; Speed, 18 knots; Completed, 1898–1900;
Armament, 4—12 in., 10—5·5 in., 8—3·9 in., 34 small.

See page 203.

FRANCE.

BATTLESHIPS.

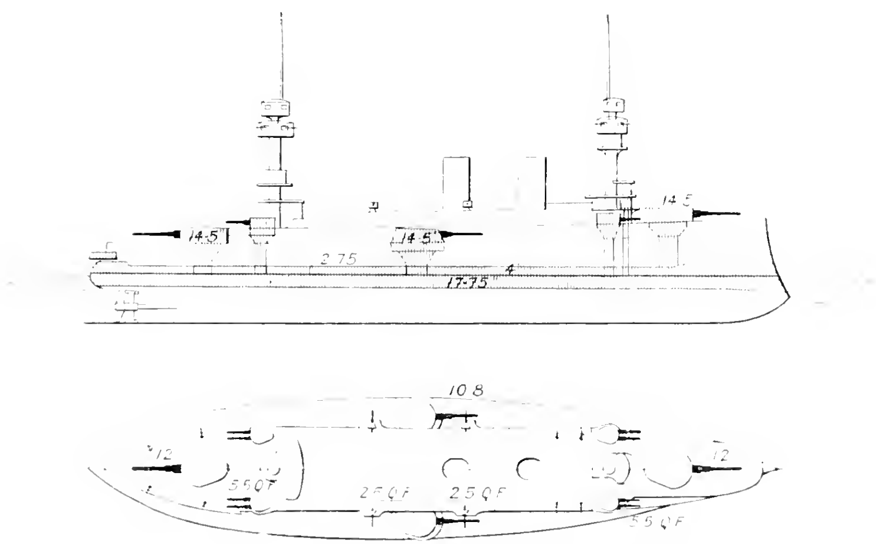
Carnot.



Length, 382 ft. ; 11,954 tons ; Speed, 17·8 knots ; Completed, 1896 ;
Armament, 2—12 in., 2—10·8 in., 8—5·5 in., 30 small.

See page 203.

Jauréguiberry.



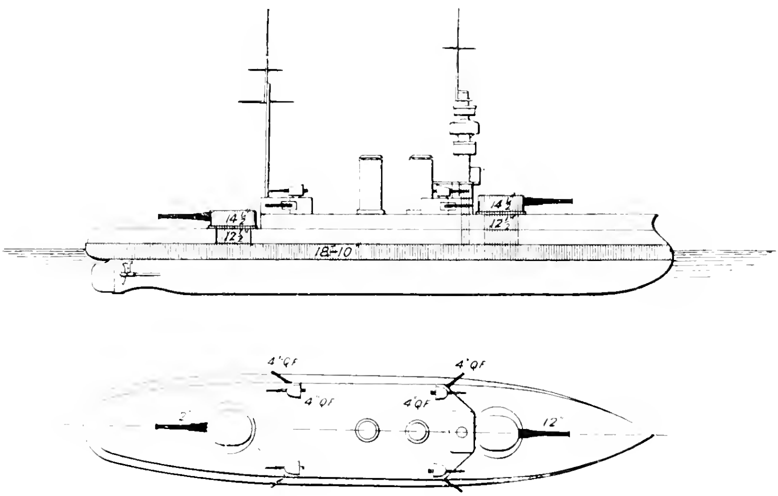
Length, 364 ft. ; 11,637 tons ; Speed, 18 knots ; Completed, 1896 ;
Armament, 2—12 in., 2—10·8 in., 8—5·5 in., 32 small.

See page 204.

FRANCE.

BATTLESHIPS.

Bouvines. *Tréhouart.



* The "Tréhouart" has but one funnel

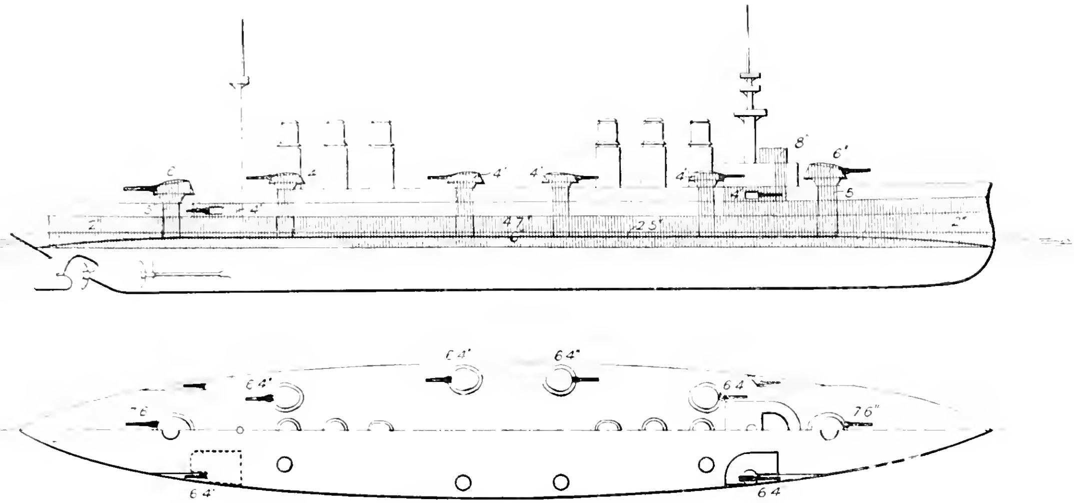
Length, 294 ft.; 6671–6691 tons; Speed, 15·7—16 knots; Completed, 1894–1896;
Armament, 2—12 in., 8—4 in., 14 small.

See page 203.

FRANCE.

ARMOURED CRUISERS

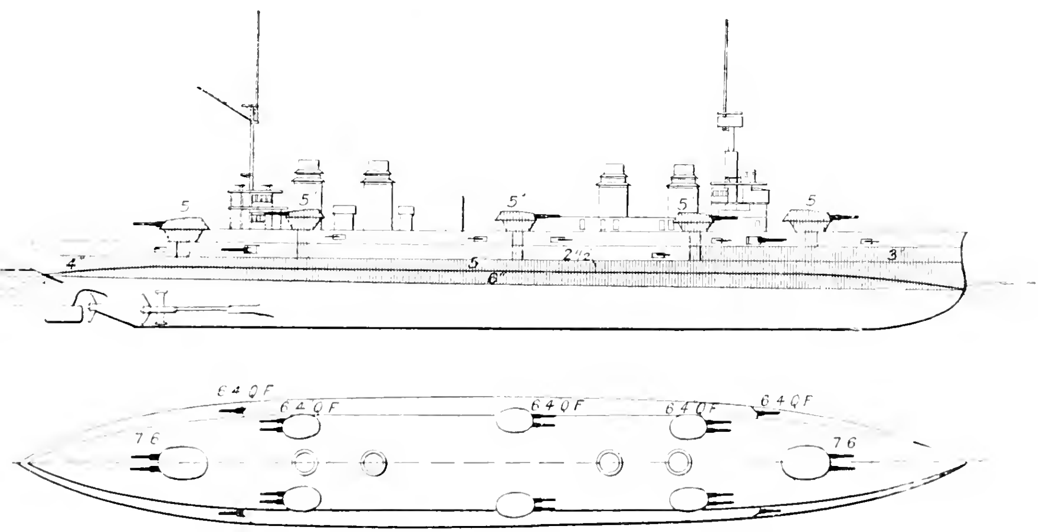
Ernest Renan.



Length, 515 ft. ; 13,427 tons ; Speed, 24·2 knots ; Completed, 1909 ;
Armament, 4—7·6 in., 16—6·4 in., 24 small.

See page 204.

Jules Ferry. Léon Gambetta. Victor Hugo.



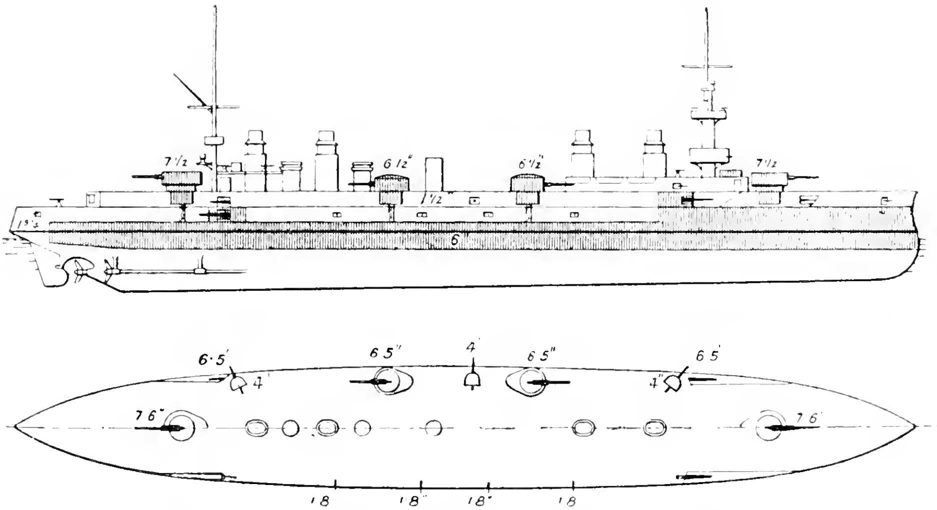
Length, 480 ft. ; 12,351 tons ; Speed, 22·5-23 knots ; Completed, 1904-1906 ;
Armament, 4—7·6 in., 16—6·4 in., 24 small.

See page 205.

FRANCE.

ARMOURED CRUISERS.

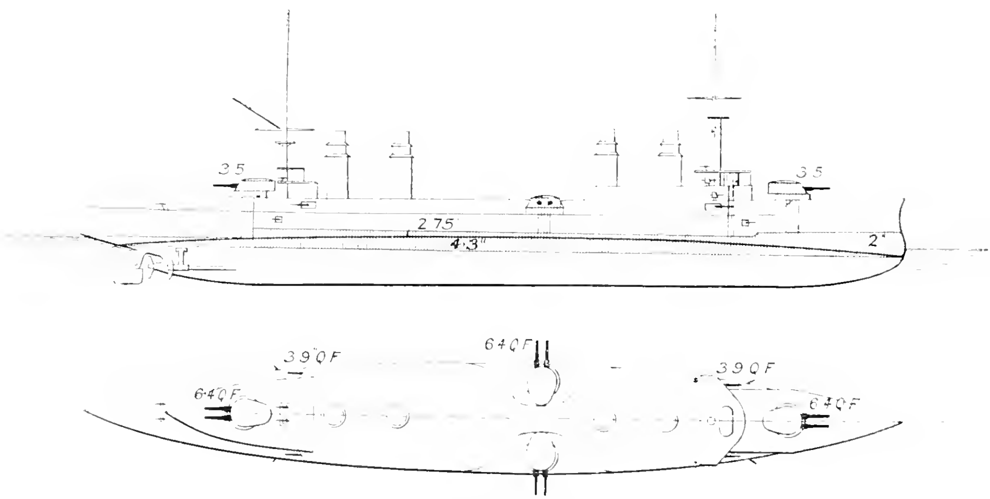
Aube. **Condé.** **Gloire.** **Marseillaise.**



Length, 453 ft. ; 9856 tons ; Speed, 21–21·9 knots ; Completed, 1903–1904 ;
Armament, 2—7·6 in., 8—6·4 in., 6—4 in., 20 small.

See page 203.

Desaix. **Dupleix.** **Kléber.**



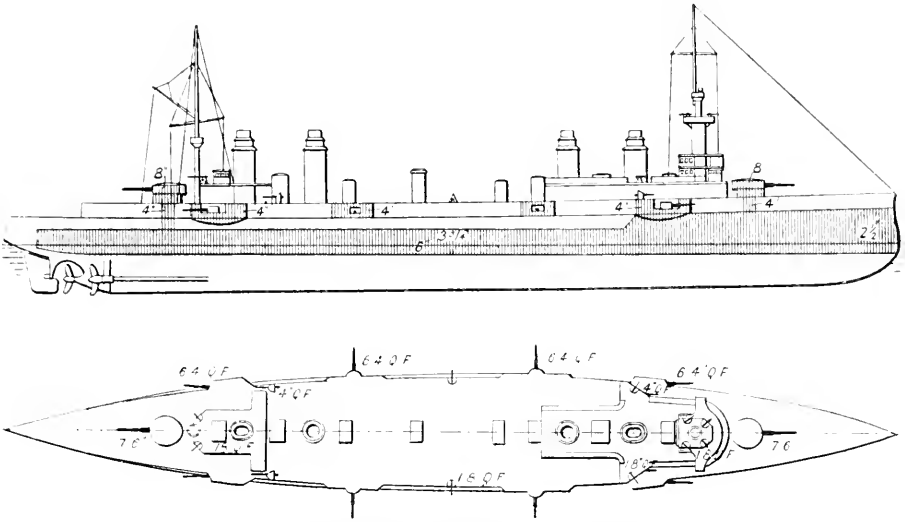
Length, 426 ft. ; 7578 tons ; Speed, 21–21·7 knots ; Completed, 1903 ;
Armament, 8—6·4 in., 4—3·9 in., 14 small.

See page 204.

FRANCE.

ARMOURED CRUISERS.

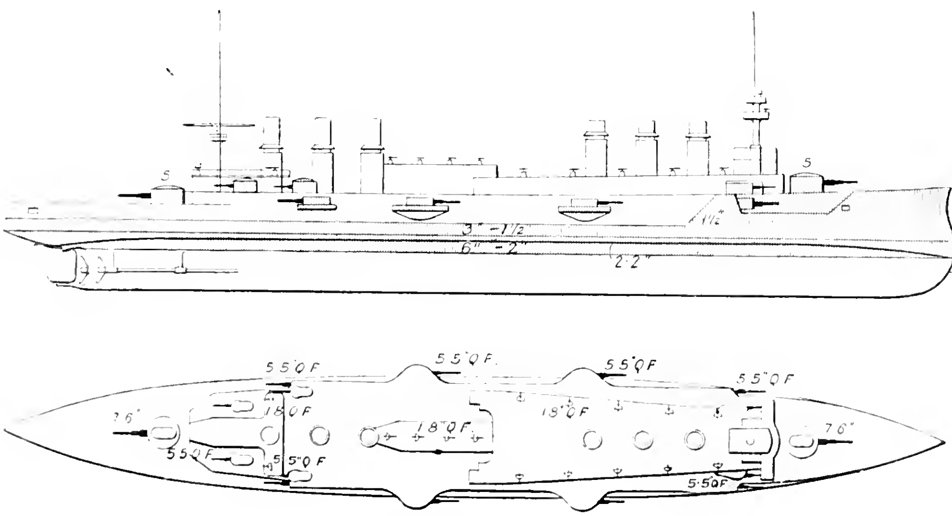
Dupetit-Thouars. Gueydon. Montcalm.



Length, 453 ft. ; 9367 tons ; Speed, 21–22·5 knots ; Completed, 1902–1905 ;
Armament, 2—7·6 in., 8—6·4 in., 4—4 in., 22 small.

See page 204.

Jeanne d'Arc.



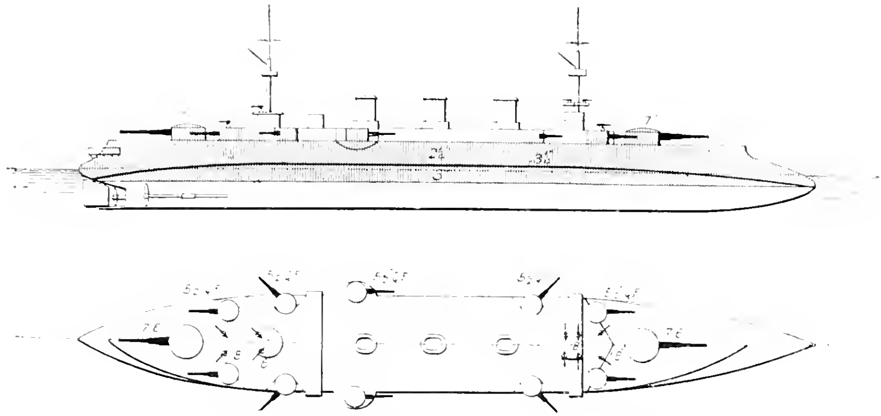
Length, 477 ft. ; 11,092 tons ; Speed, 21·7 knots ; Completed, 1903 ;
Armament, 2—7·6 in., 14—5·5 in., 26 small.

See page 205.

FRANCE.

ARMOURED CRUISER.

Pothuau.

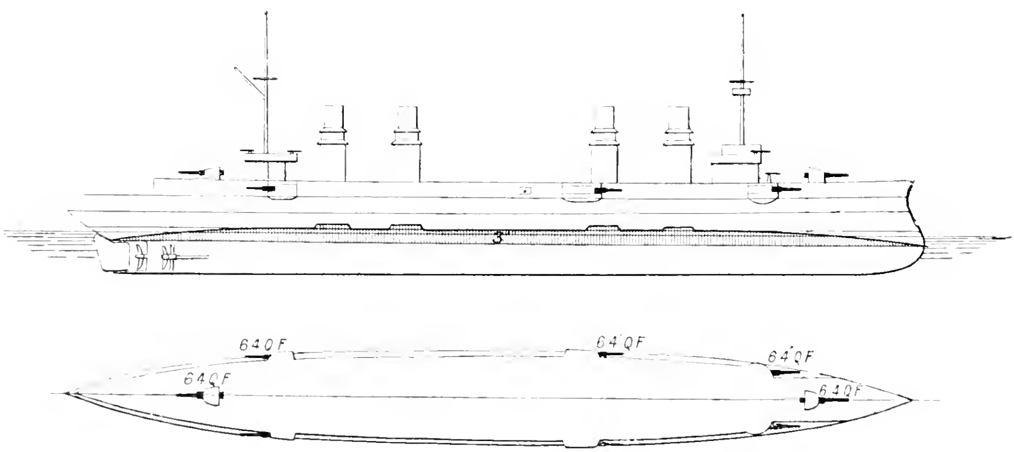


Length, 370 ft. ; 5374 tons ; Speed, 19·2 knots ; Completed, 1896 ;
Armament, 2—7·6 in., 10—5·5 in., 24 small.

See page 205.

CRUISER.

Jurien de la Gravière.



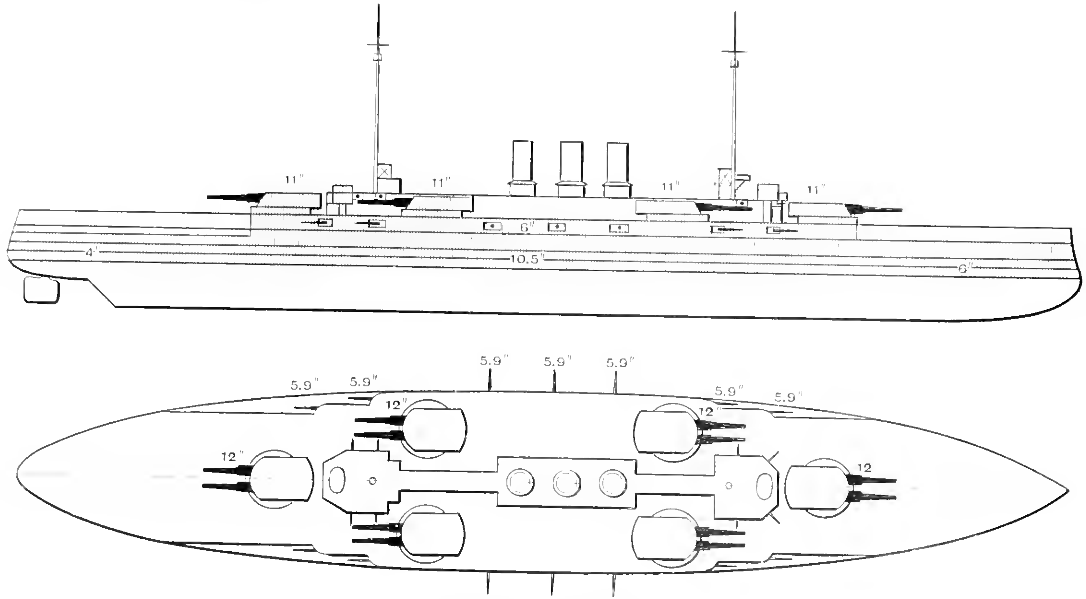
Length, 440 ft. ; 5595 tons ; Speed, 22·9 knots ; Completed, 1901 ;
Armament, 8—6·4 in., 12 small.

See page 208.

GERMANY.

BATTLESHIPS.

Helgoland. Oldenburg. Ostfriesland. Thüringen.



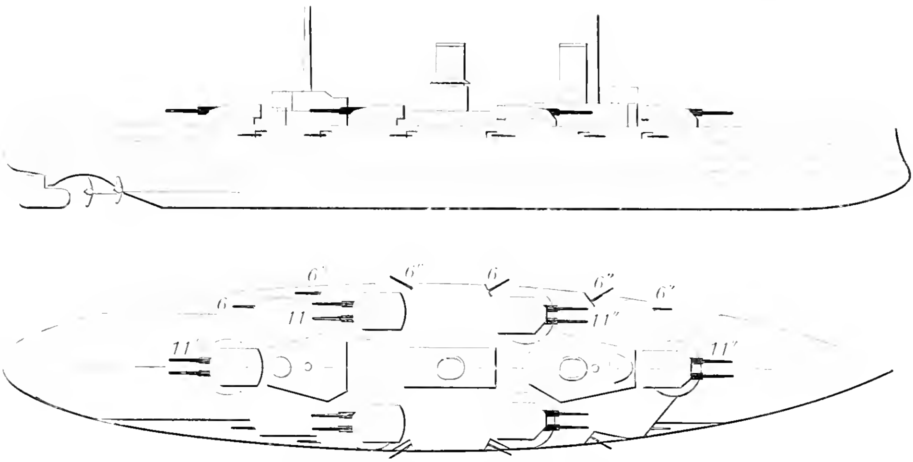
Length, 546 ft. ; 22,500 tons ; Speed, 20·5 knots ; Completed, 1911–12 ;
Armament, 12—12 in., 14—5·9 in., 14—3·4 in.

See page 209.

GERMANY.

BATTLESHIPS.

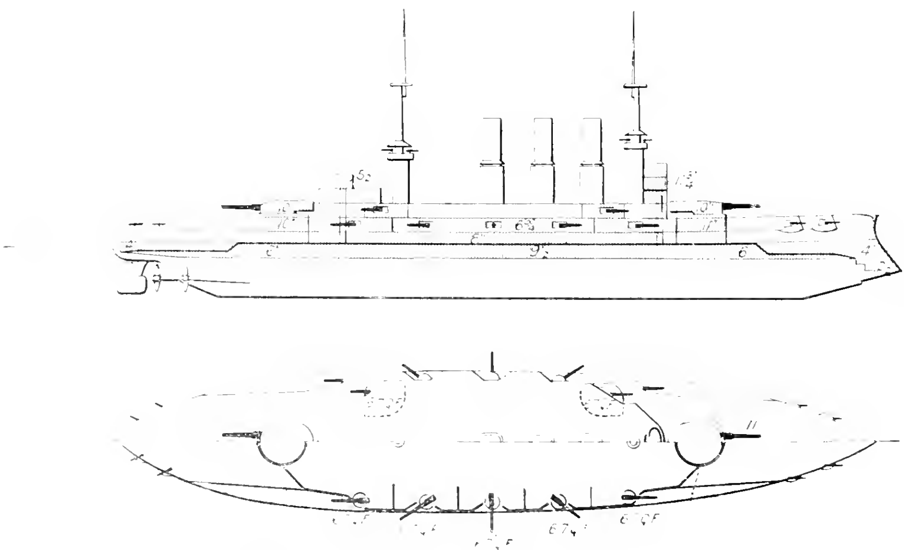
Nassau. **Posen.** **Rheinland.** **Westfalen.**



Length, 455 ft. ; 18,200 tons ; Speed, 20 knots ; Completed, 1909-1910 ;
Armament, 12—11 in., 12—6 in., 16—3·4 in.

See page 210.

Deutschland. **Hannover.** **Pommern.** **Schlesien.** **Schleswig-Holstein.**



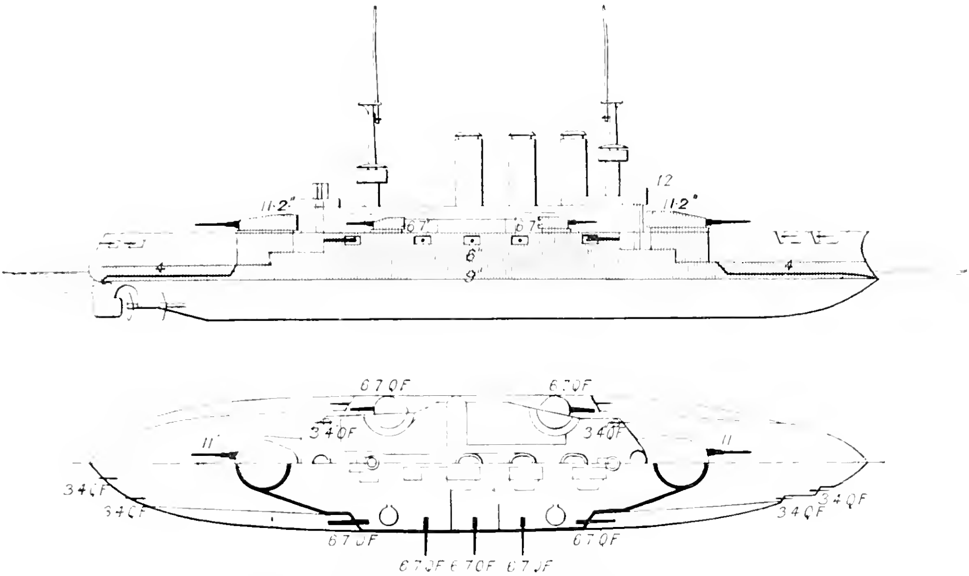
Length, 398 ft. ; 13,040 tons ; Speed, 18·5—19·2 knots ; Completed, 1906-1909 ;
Armament, 4—11 in., 14—6·7 in., 22—3·4 in., 8 small.

See page 209.

GERMANY.

BATTLESHIPS.

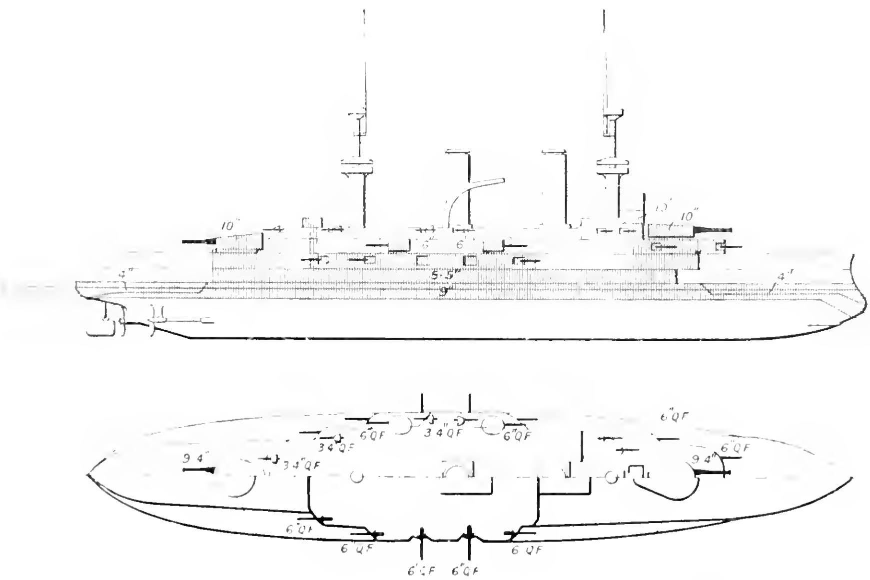
Braunschweig. Elsass. Hessen. Lothringen. Preussen.



Length, 398 ft.; 12,997 tons; Speed, 18–18·7 knots; Completed, 1904–1906;
Armament, 4—11 in., 14—6·7 in., 12—3·4 in., 20 small.

See page 209.

Mecklenburg. Schwaben. We‥in. Wittelsbach. Zähringen.



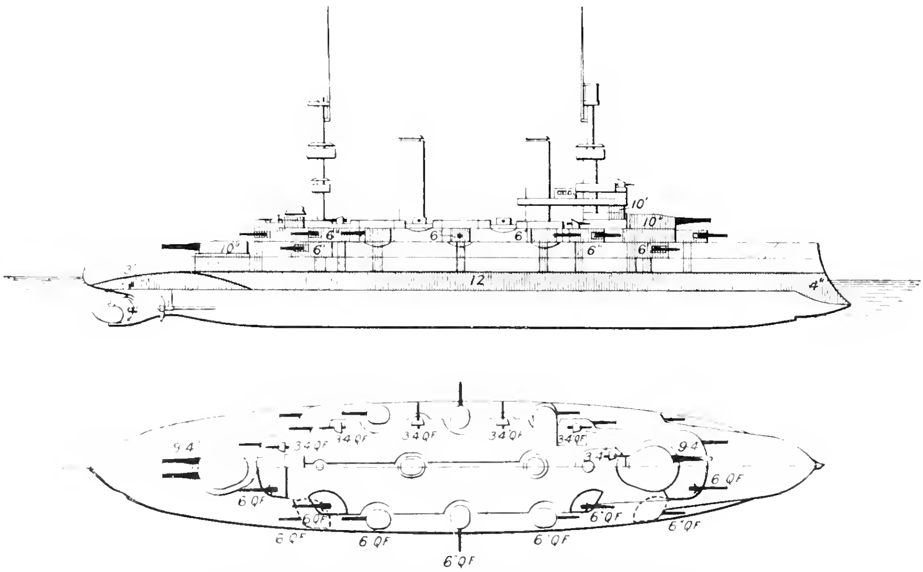
Length, 391 ft.; 11,643 tons; Speed, 18–19 knots; Completed, 1902–1903;
Armament, 4—9·4 in., 18—6 in., 12—3·4 in., 20 small.

See page 210

PLATE 35.

BATTLESHIPS.

Kaiser Friedrich III. Kaiser Karl der Grosse. Kaiser Wilhelm II. Kaiser Wilhelm der Grosse.



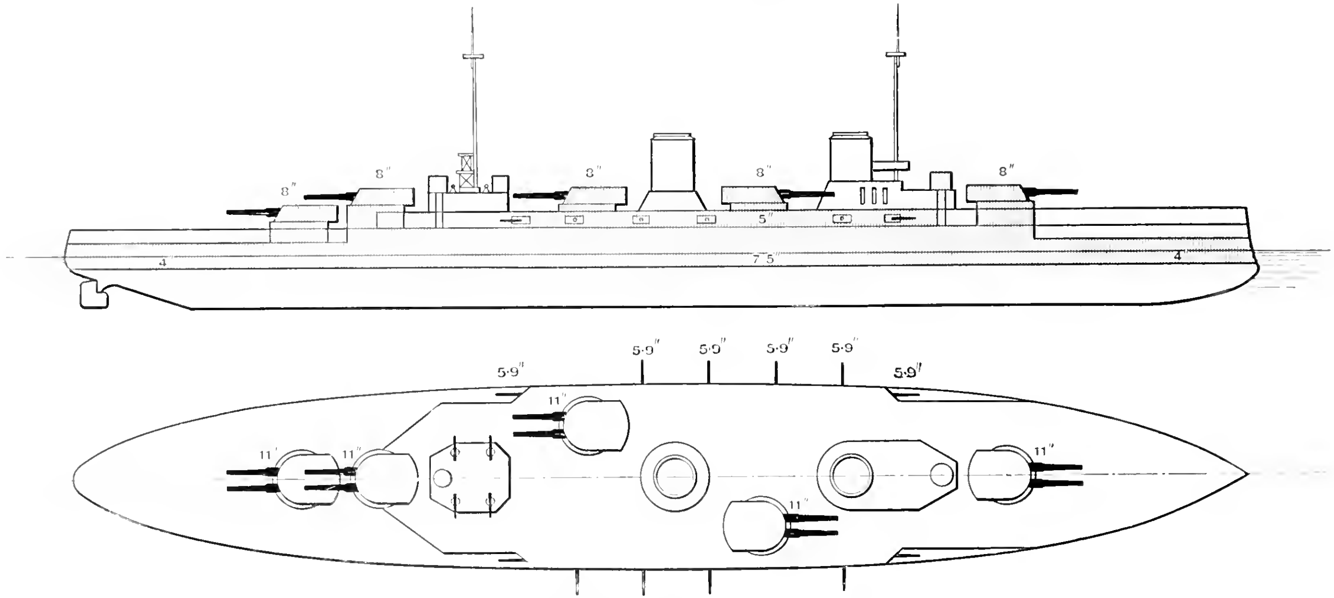
Length, 377 ft. ; 10,974 tons ; Speed, 18 knots ; Completed, 1898-1901 ;
Armament, 4—9·4 in., 18—6 in., 12—3·4 in., 20 small.
NOTE.—Superstructure is being cut down.

See page 210.

GERMANY.

ARMOURED CRUISERS.

Moltke. **Goeben.**



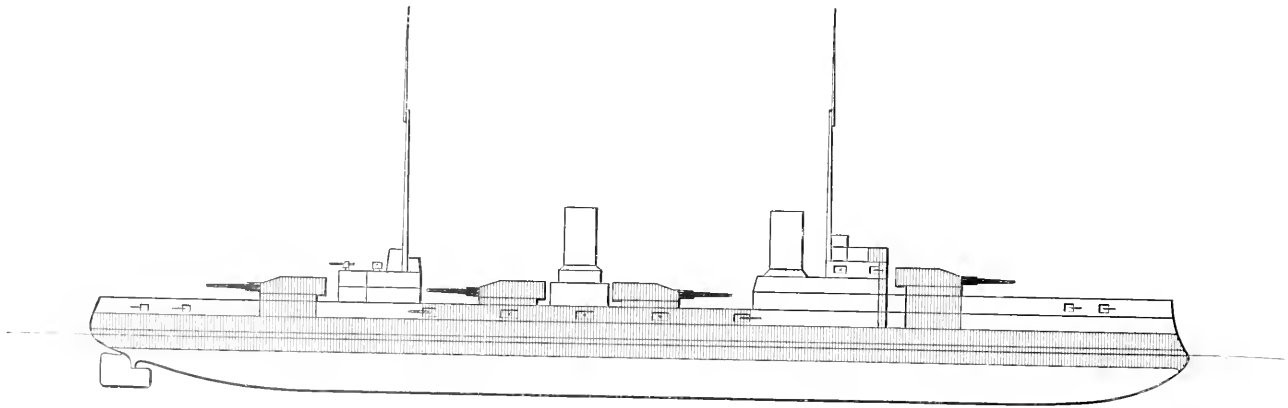
Length, 612 ft. ; 22,600 tons ; Speed, 28 knots ; Completed, 1911 and Building :
Armament, 10—11 in., 12—5·9 in., 12—3·4 in.

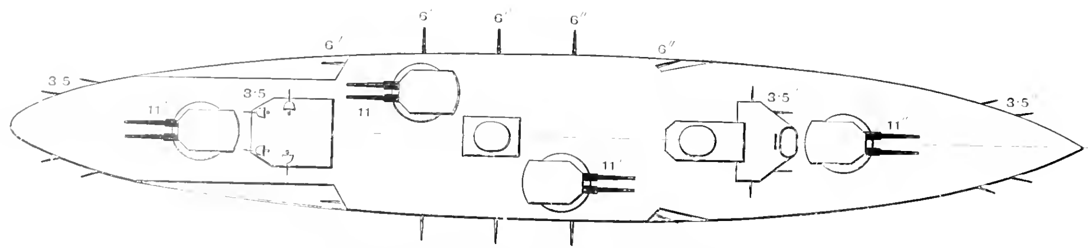
See page 210.

GERMANY.

ARMOURED CRUISER.

Von der Tann.





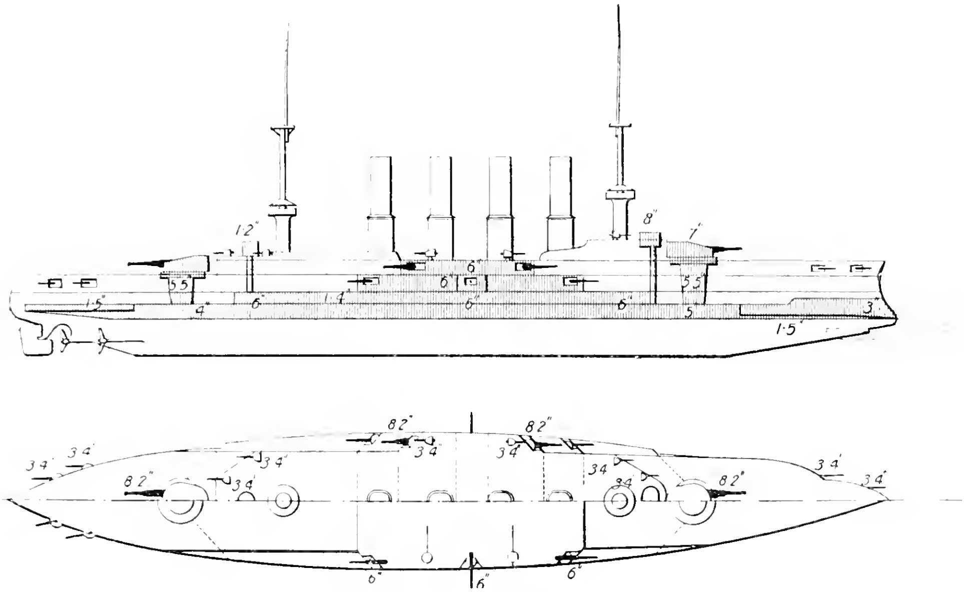
Length, 561 ft.; 18,700 tons; Speed, 27·6 knots; Completed, 1911:
Armament, 8—11 in., 10—6 in., 16—3·5 in.

See page 211.

GERMANY.

ARMOURED CRUISERS.

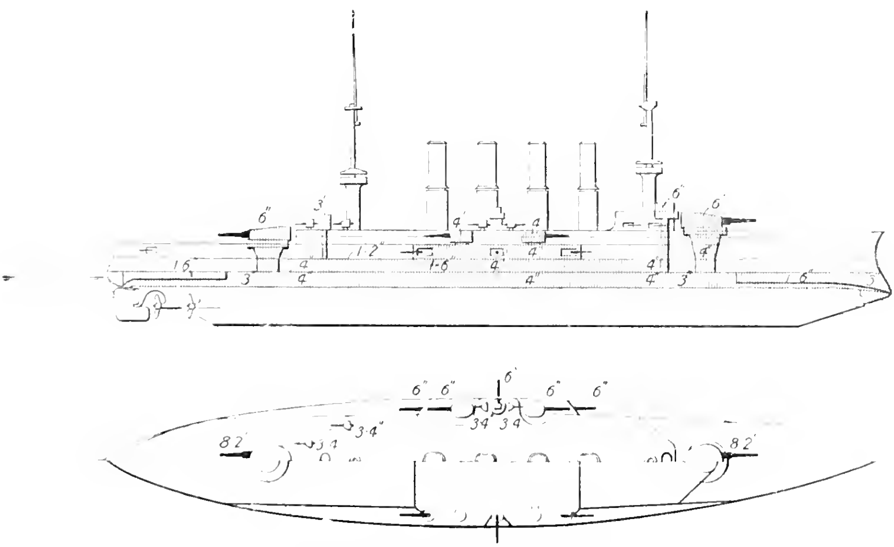
Gneisenau. **Scharnhorst.**



Length, 450 ft.; 11,420 tons; Speed, 22·5—23·8 knots; Completed, 1908; Armament, 8—8·2 in., 6—6 in., 20—3·4 in., 14 small.

See page 209.

Roon. **Yorck.**



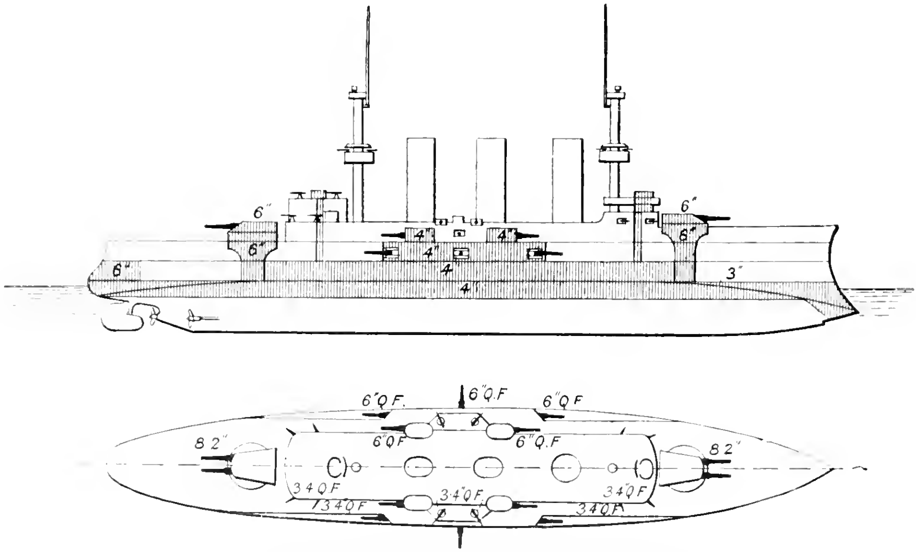
Length, 403 ft.; 9350 tons; Speed, 21·1 knots; Completed, 1905; Armament, 4—8·2 in., 10—6 in., 16—3·4 in., 14 small.

See page 211.

GERMANY.

ARMOURED CRUISERS.

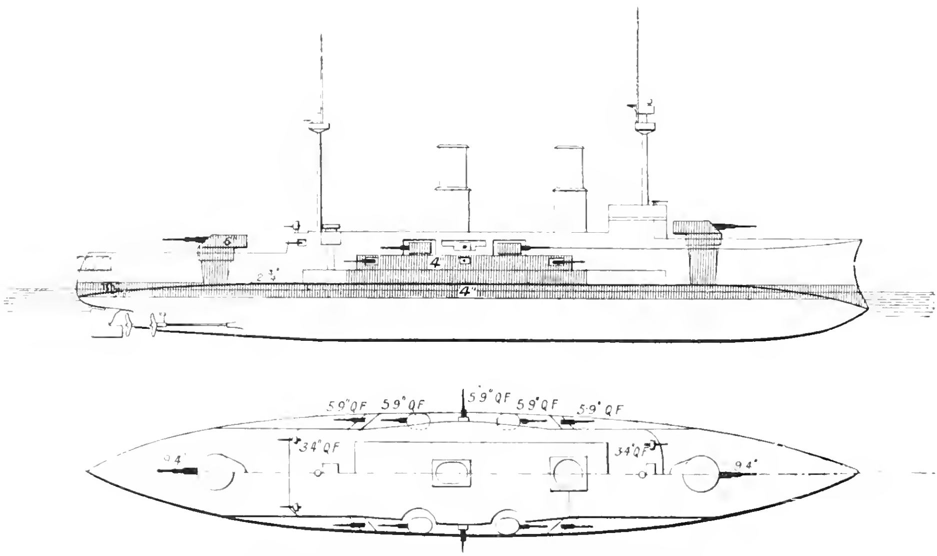
Prinz Adalbert. Friedrich Karl.



Length, 393 ft. : 8858 tons : Speed, 20·3—20·5 knots : Completed, 1903-1904 ;
Armament, 4—8·2 in., 10—6 in., 12—3·4 in., 18 small.

See page 211.

Prinz Heinrich.



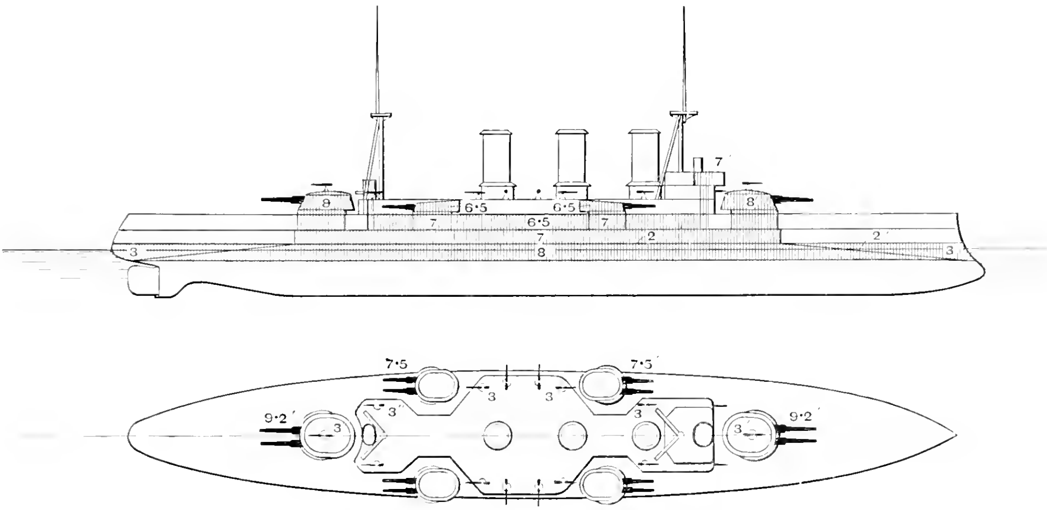
Length, 396 ft. : 8759 tons : Speed, 20 knots : Completed, 1902 ;
Armament, 2—9·4 in., 10—5·9 in., 10—3·4 in., 14 small.

See page 211.

GREECE.

ARMOURED CRUISER.

Giorgios Averoff.



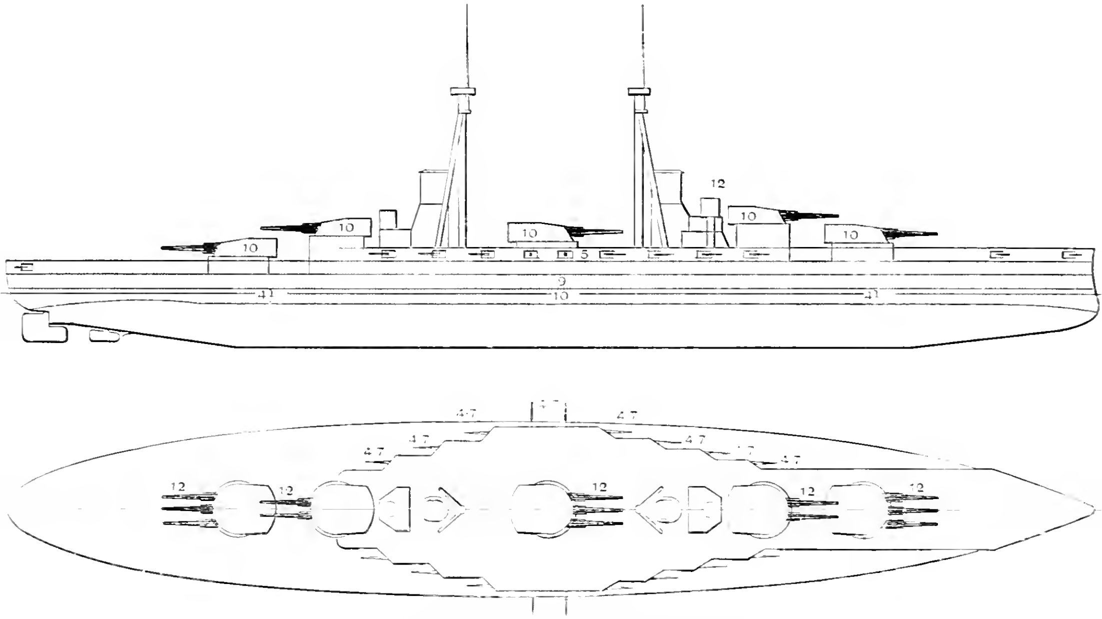
Length, 430 ft. : 9956 tons ; Speed, 24 knots ; Completed, 1911.
Armament, 4—9·2 in., 8—7·5 in., 16—3 in.

See page 216.

ITALY.

BATTLESHIPS.

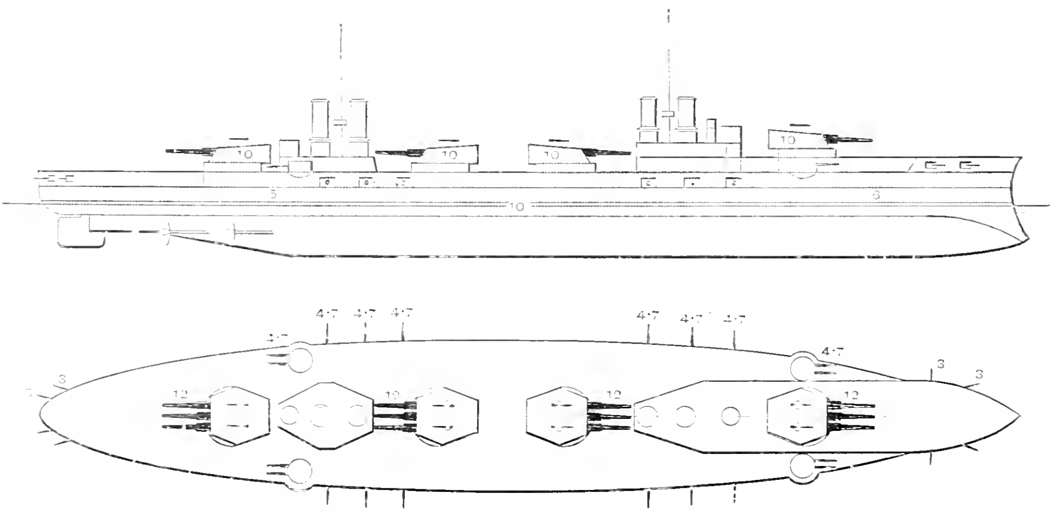
Conte di Cavour. Giulio Cesare. Leonardo da Vinci. Andrea Doria. Duilio.



Length, 557 ft.; 24,000 tons; Speed, 22 knots; Building; Armament, 13—12 in., 20—4·7 in., 14—12 pr.

See page 217.

Dante Alighieri.



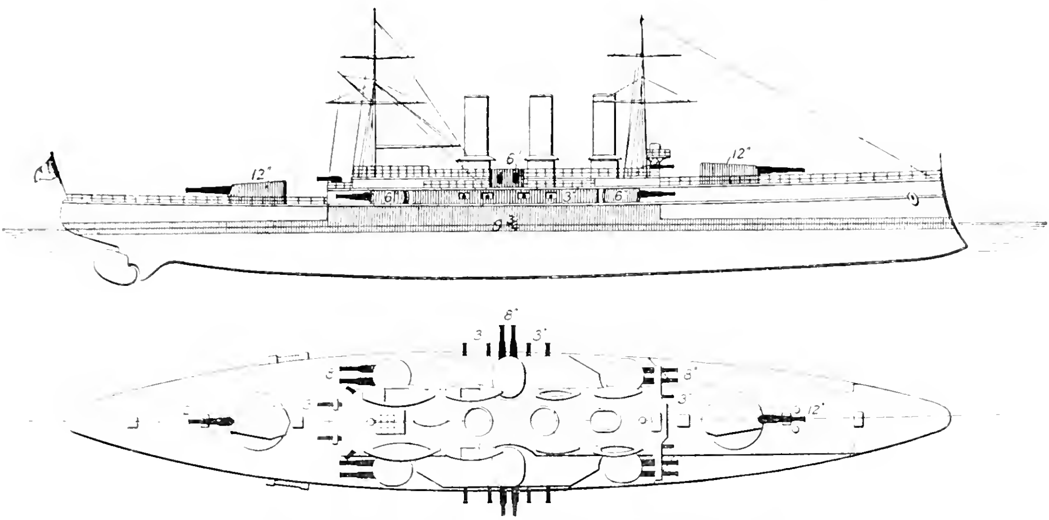
Length, 505 ft.; 18,300 tons; Speed, 23 knots; Building; Armament, 12—12 in., 20—4·7 in., 16—3 in.

See page 217.

ITALY.

BATTLESHIPS.

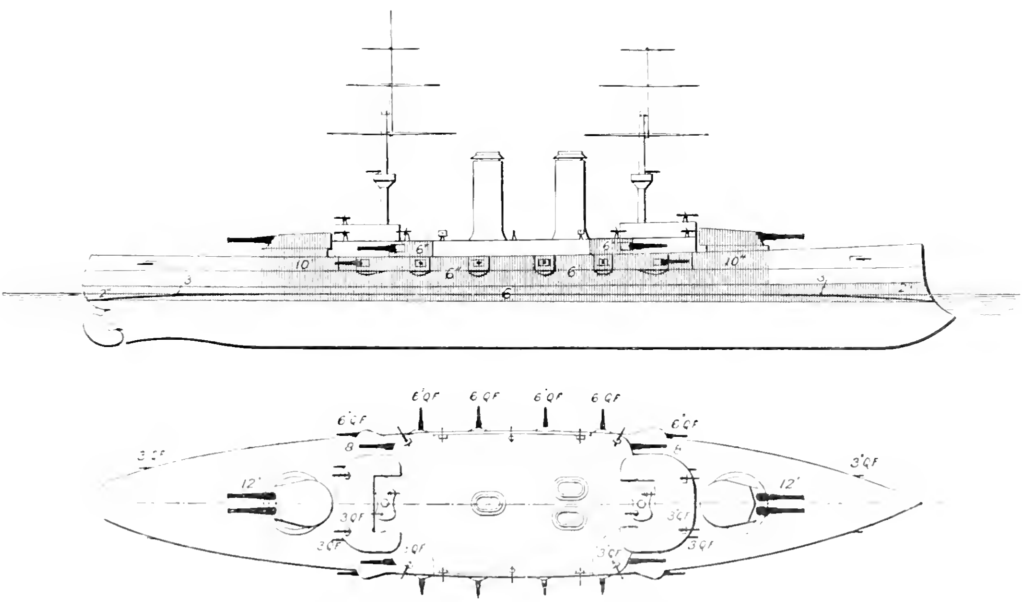
Napoli. Regina Elena. Roma. Vittorio Emanuele.



Length, 435 ft. ; 12,425 tons ; Speed, 22 knots ; Completed, 1907—1909 ;
Armament, 2—12 in., 12—8 in., 12—3 in., 12 small.

See page 218.

Benedetto Brin. Regina Margherita.



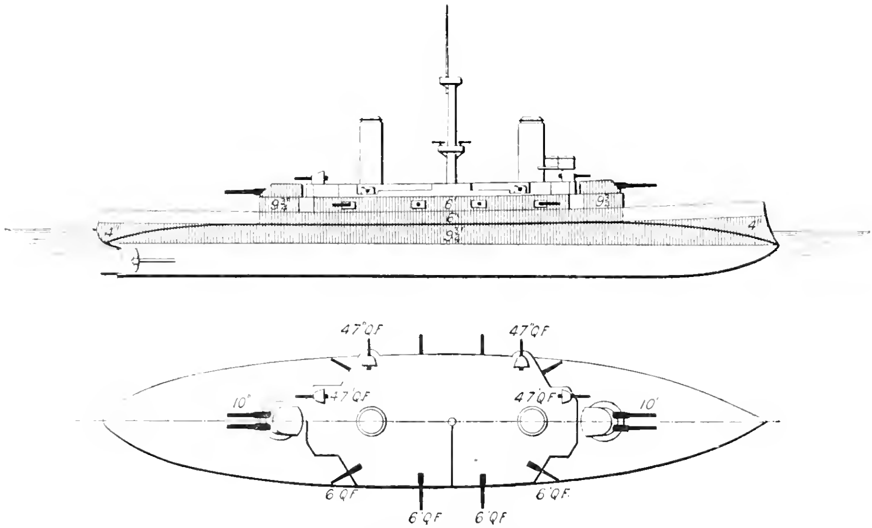
Length, 426 ft. ; 13,214 tons ; Speed, 19·5–20·2 knots ; Completed, 1904 ;
Armament, 4—12 in., 4—8 in., 12—6 in., 16—3 in., 12 small.

See page 217.

ITALY.

BATTLESHIPS.

Ammiraglio di St. Bon. **Emanuele Filiberto.**

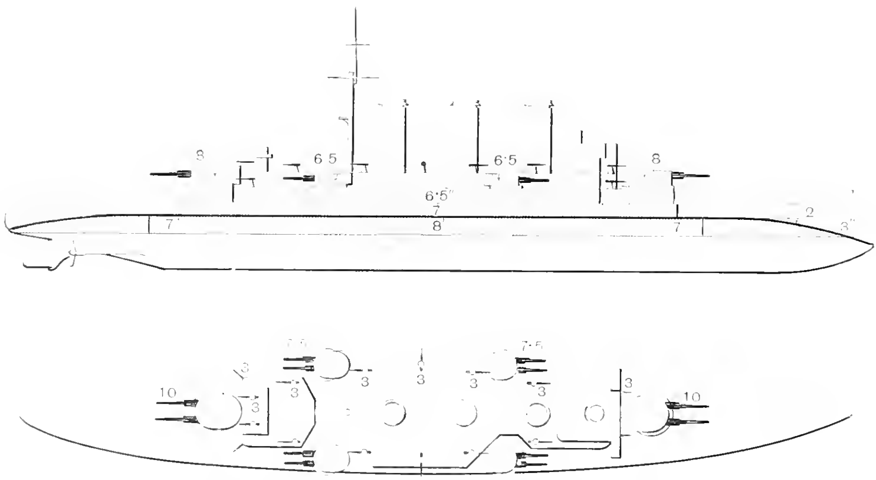


Length, 344 ft. ; 9645 tons ; Speed, 18·3 knots ; Completed, 1901–1902 ;
Armament, 4—10 in., 8—6 in., 8—4·7 in., 2—2·9 in., 22 small.

See page 217.

ARMOURED CRUISERS.

Amalfi. **Pisa.**



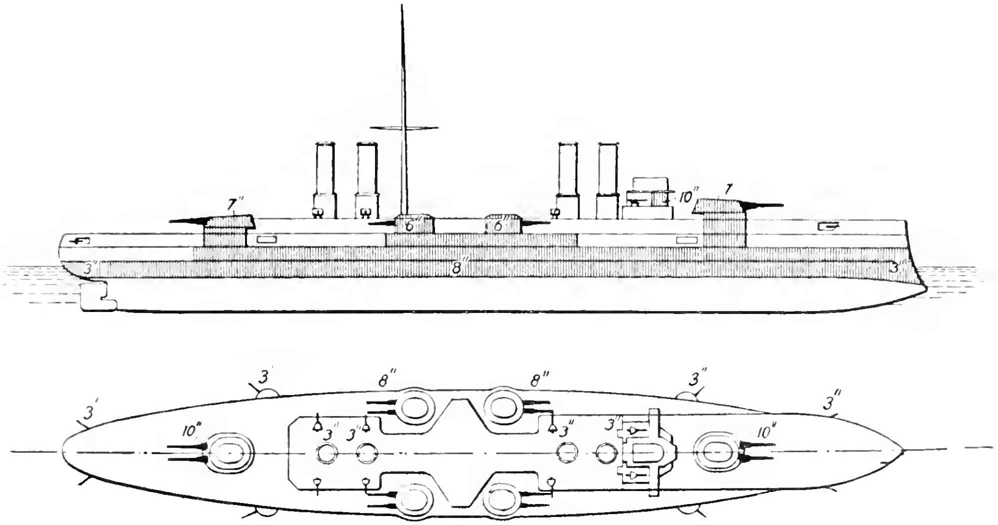
Length, 430 ft. ; 9,832 tons ; Speed, 23 knots ; Completed, 1909 ;
Armament, 4—10 in., 8—7·5 in., 16—3 in., 2 small.

See page 217.

ITALY.

ARMOURED CRUISERS.

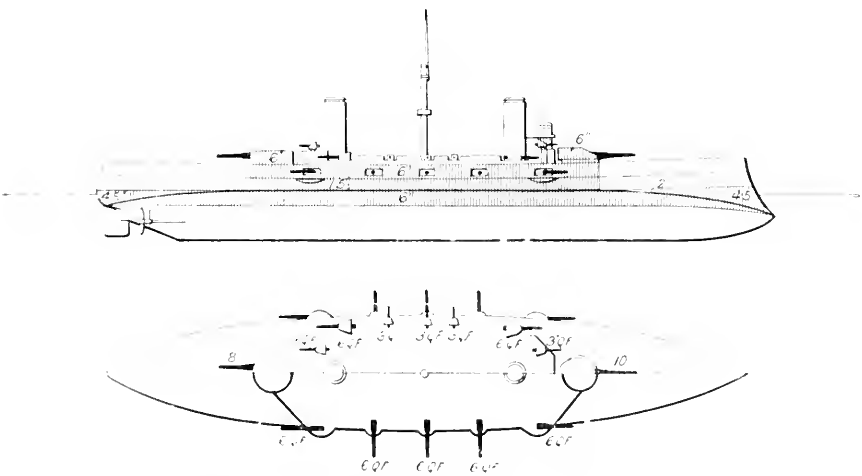
S. Giorgio. S. Marco.



Length, 430 ft.; 9832 tons; Speed, 22·5 knots; Building;
Armament, 4—10 in., 8—8 in., 16—3 in.

See page 218.

Francesco Ferruccio. Giuseppe Garibaldi. Varese.



Length, 344 ft.; 7234 tons; Speed, 20 knots; Completed, 1900–1904;
Armament, 1—10 in., 2—8 in., 14—6 in., 10—3 in., 8 small.

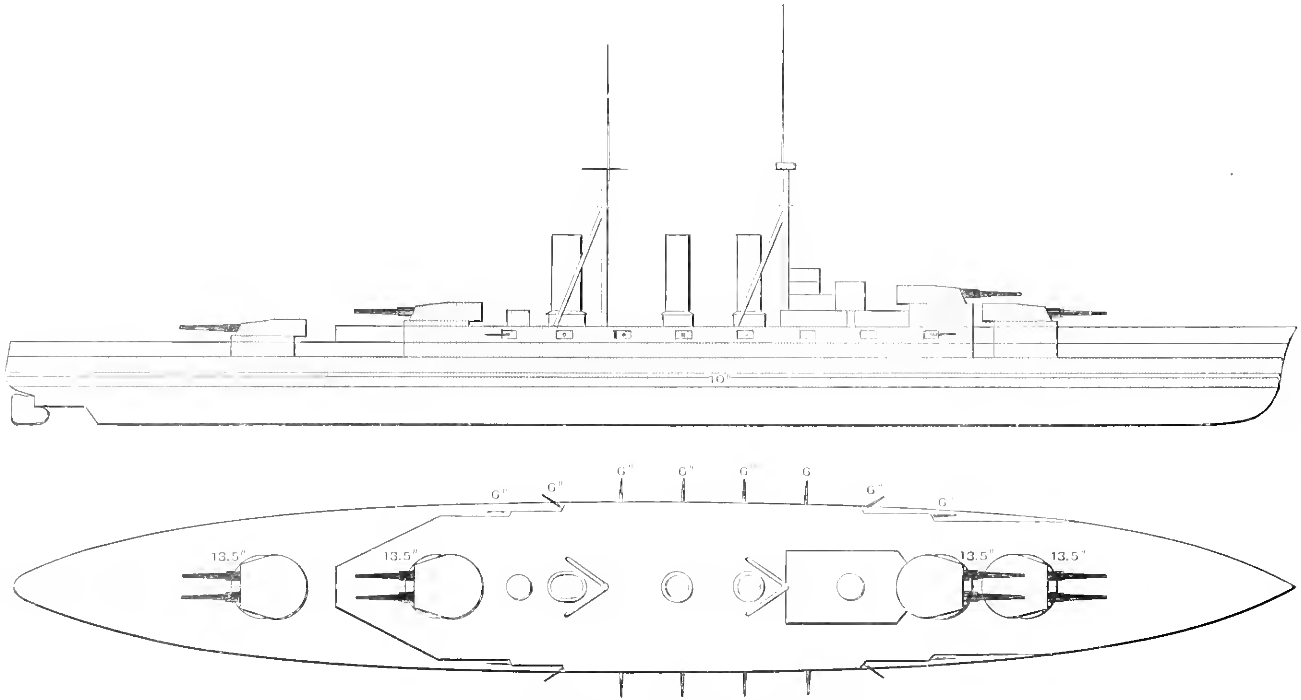
See page 217.

PLATE 15.

JAPAN.

BATTLESHIPS.

Hiyei. Haruna. Kirishima. Kongo.



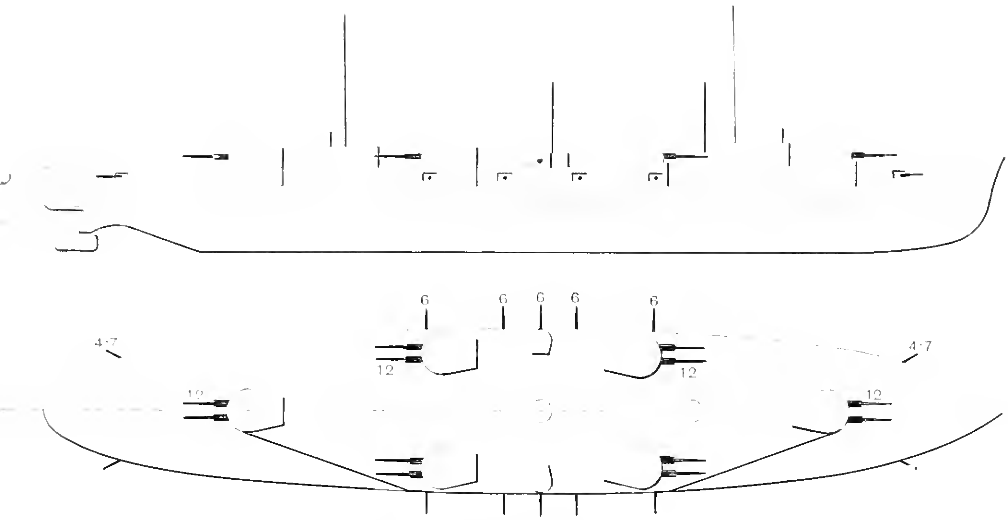
Length ft.; 27,500 tons; Speed, 27 knots; Building: Armament, 8—13·5 in., 16—6 in.

See page 221.

JAPAN.

BATTLESHIPS.

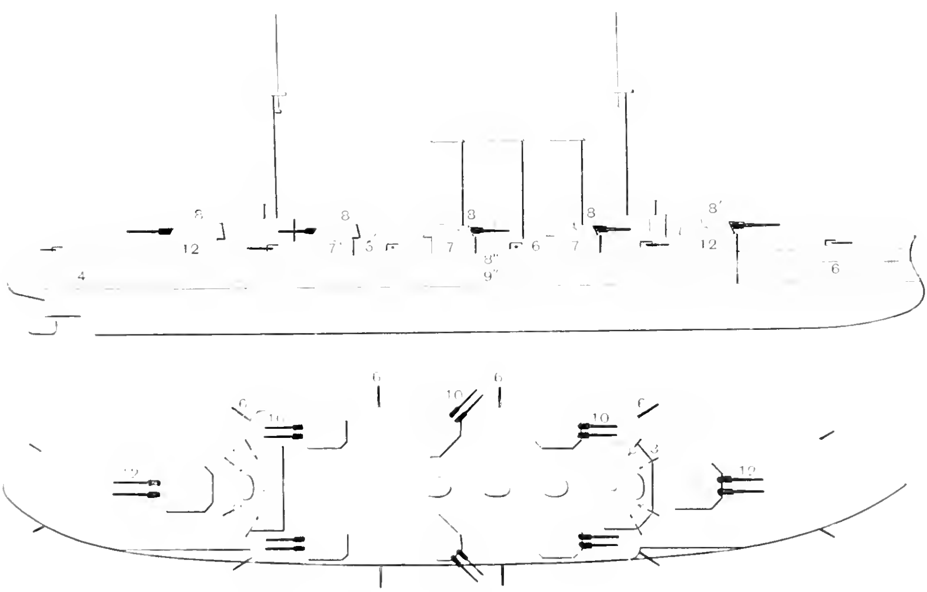
Kawachi. Settsu.



Length, 480 ft. ; 20,800 tons ; Speed, 20·5 knots ; Building ;
Armament, 12—12 in. ; 10—6 in. ; 12—4·7 in.

See page 222.

Aki.



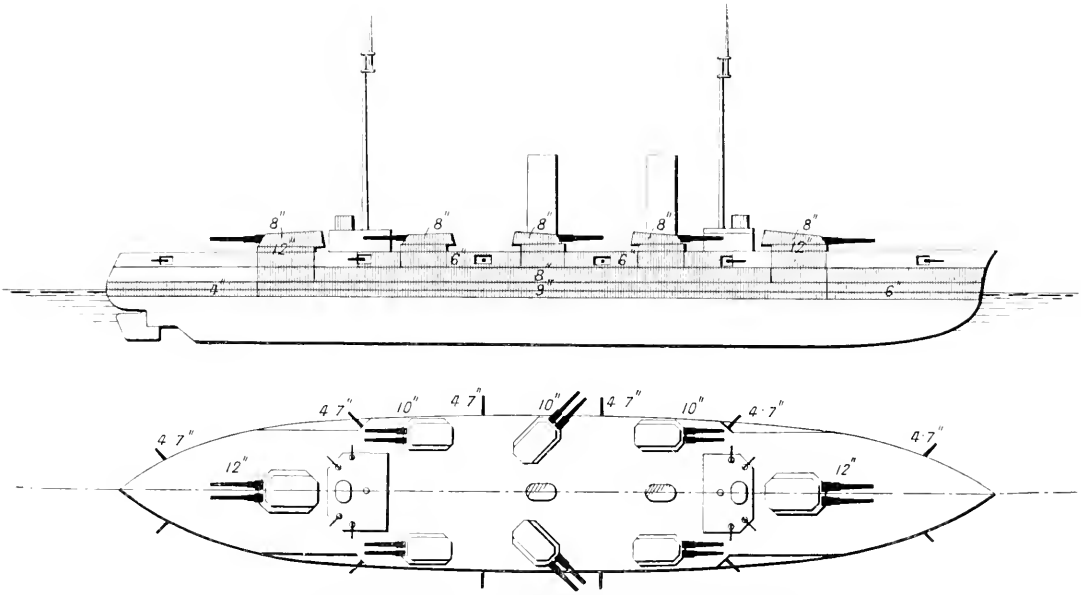
Length, 482 ft. ; 19,800 tons ; Speed, 20·5 knots ; Completed 1911 ;
Armament, 4—12 in., 12—10 in., 8—6 in., 8—12 pr., 4 small.

See page 221.

JAPAN.

BATTLESHIPS.

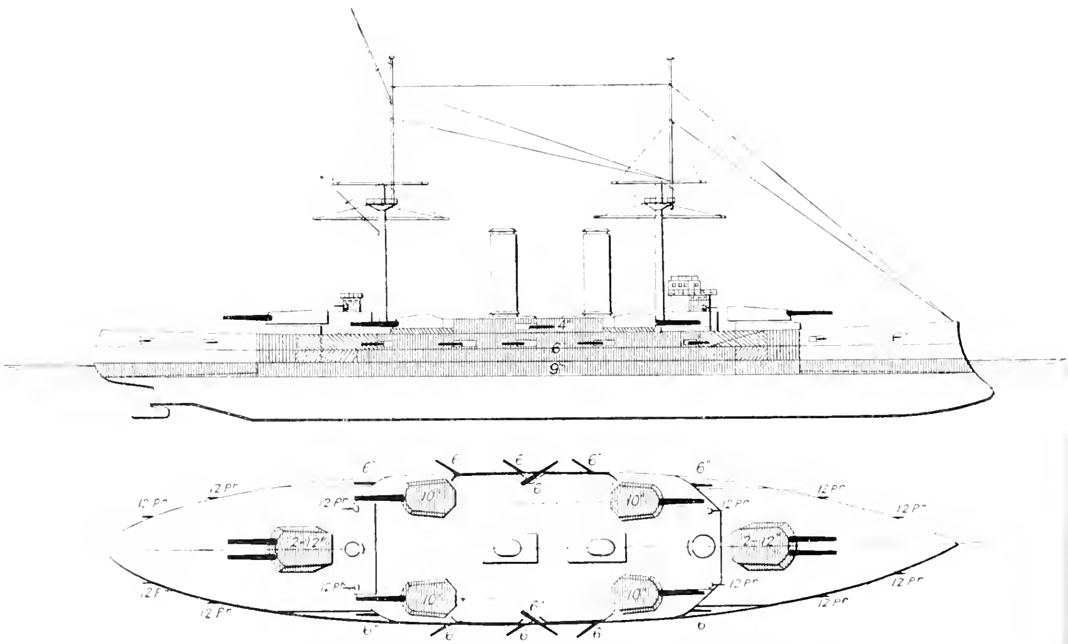
Satsuma.



Length, 482 ft.; 19,350 tons; Speed, 20·5 knots; Completed, 1909; Armament, 4—12 in., 12—10 in., 12—4·7 in., 4—12 pr., 4 small.

See page 223.

Kashima. Katori.



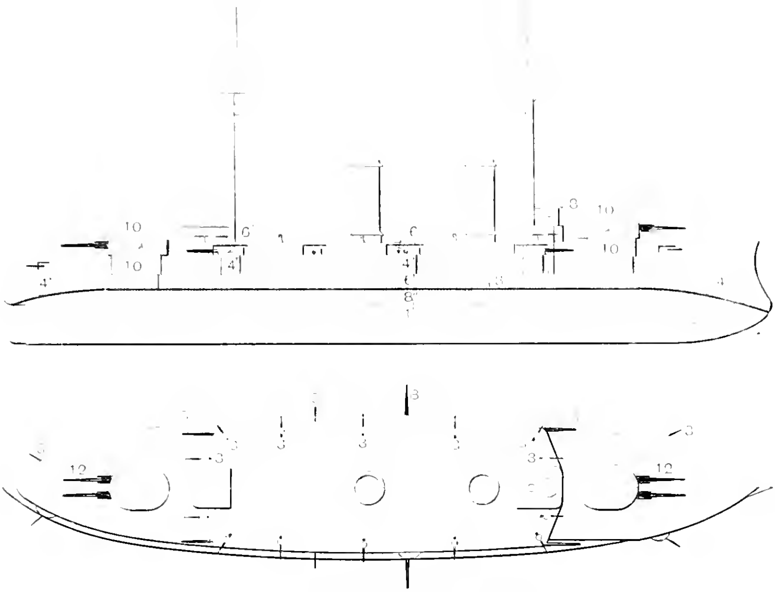
Length, 420-425 ft.; 15,950-16,400 tons; Speed, 19·5 knots; Completed, 1906; Armament, 4—12 in., 4—10 in., 12—6 in., 12—12 pr., 11 small.

See page 222.

JAPAN.

BATTLESHIPS.

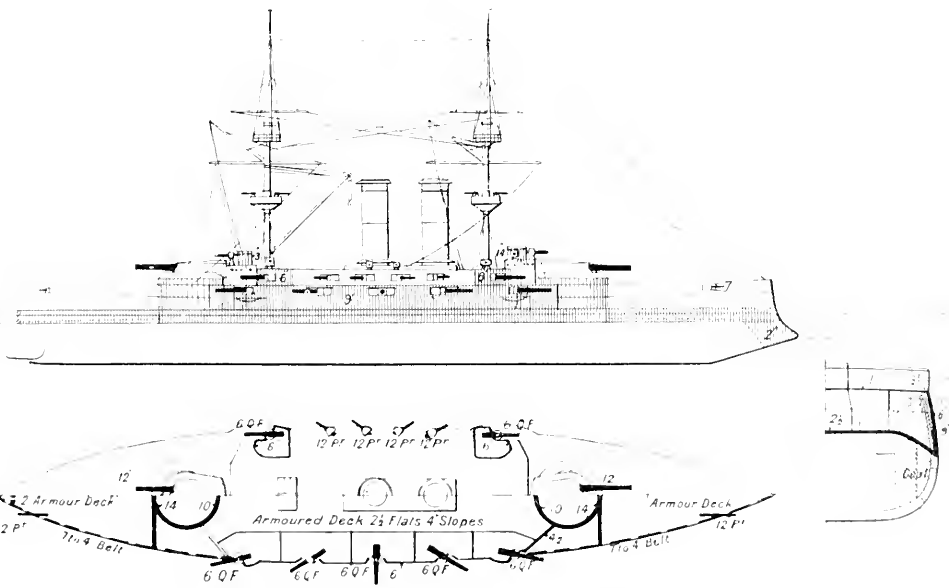
Iwami (ex Orel).



Length 368 ft.; 13,516 tons; Speed, 18 knots; Completed, 1904;
Armament, 4—12 in., 6—8 in., 20—3 in., 26 small.

See page 222.

Mikasa.



Length, 400 ft.; 15,200 tons; Speed, 18.5 knots; Completed, 1902.
Armament, 4—12 in., 4—10 in., 10—6 in., 20—12 pr., 20 small.

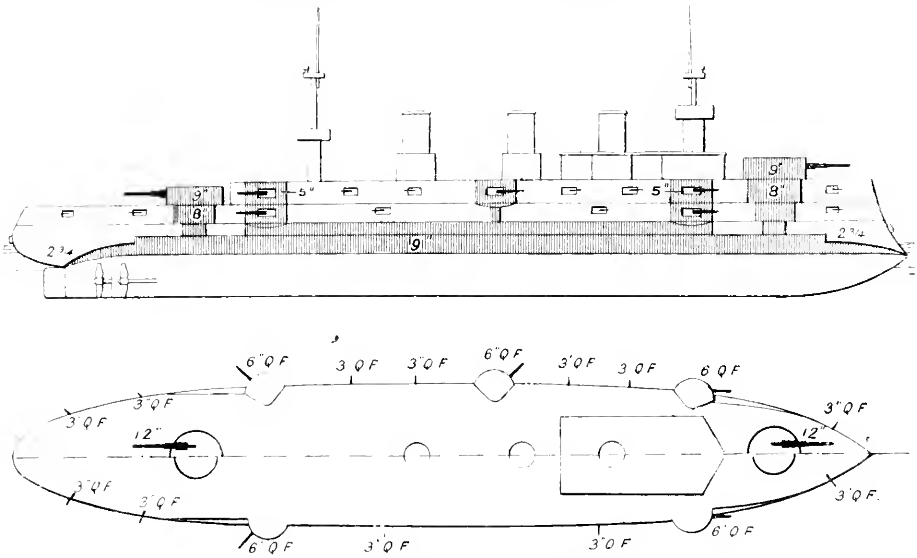
See page 222.

NOTE.—4—10 in. guns have been substituted for 4—6 in. on upper deck.

JAPAN.

BATTLESHIPS.

Sagami *late* **Peresviet.** **Suo** *late* **Pobieda.**

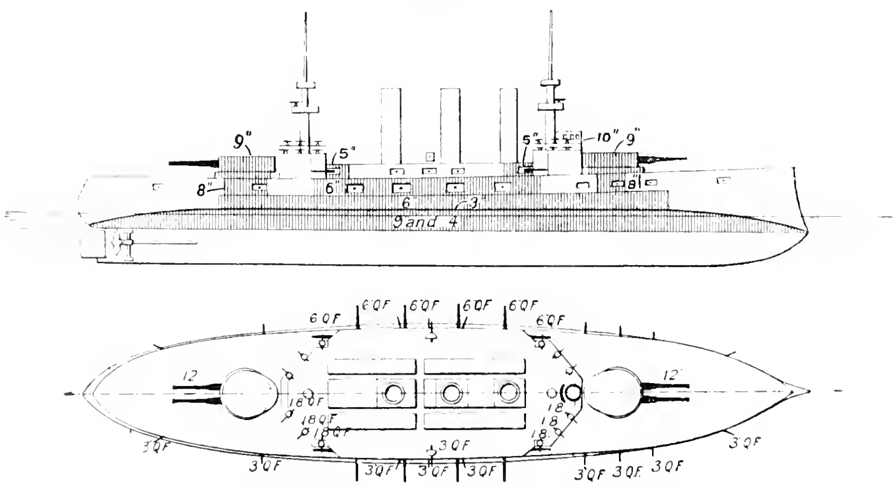


Note: In the "Pobieda" the Belt Extends the Full Length of the Ship

Length, 401 ft. ; 12,674 tons ; Speed, 18 knots ; Completed, 1901 ;
Armament, 4—12 in., 10—6 in., 16—12 pr., 27 small.

See page 223.

Hizen *late* **Retvizan.**



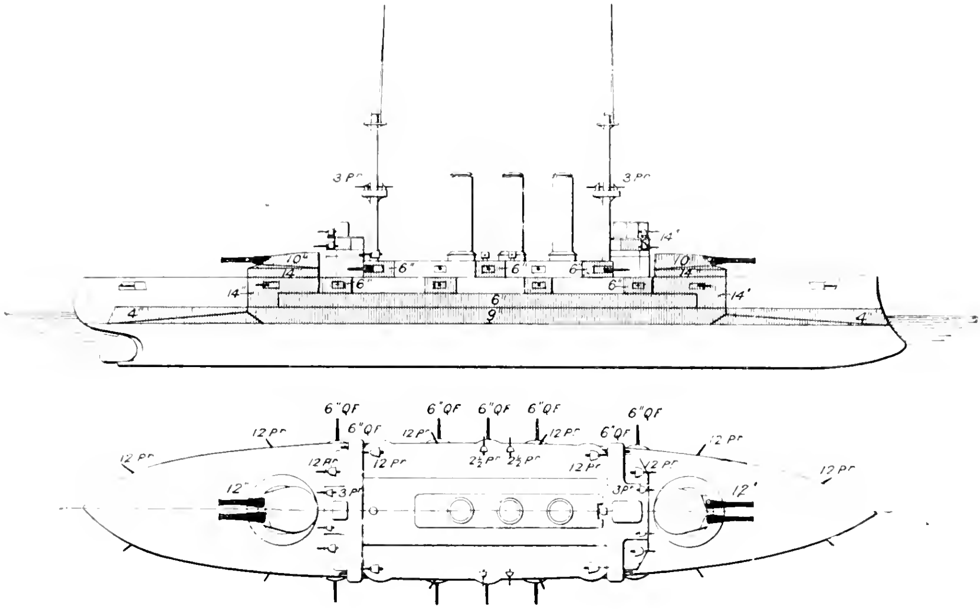
Length, 374 ft. ; 12,700 tons ; Speed, 18 knots ; Completed, 1902 ;
Armament, 4—12 in., 12—6 in., 20—12 pr., 6 small.

See page 221.

JAPAN.

BATTLESHIPS.

Asahi. Shikishima.

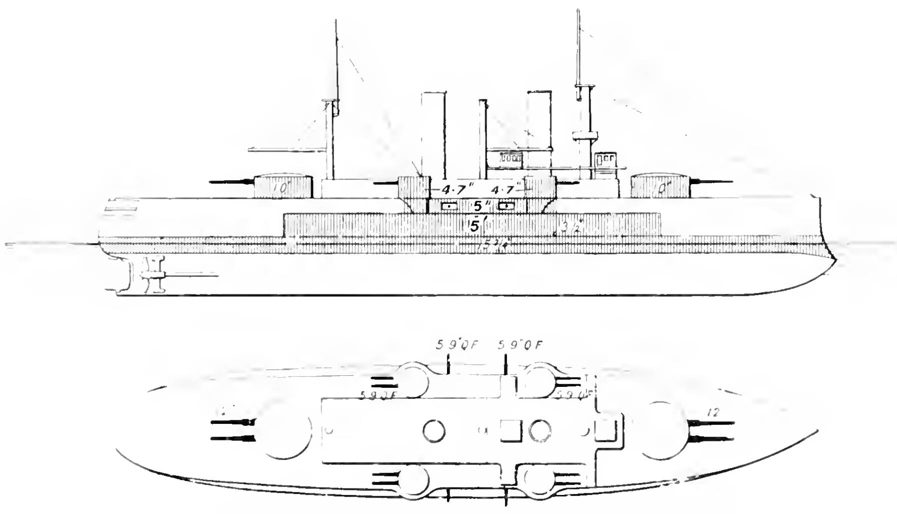


The "Asahi" has but two funnels.

Length, 400 ft. : 14,850 - 15,800 tons ; Speed, 18—18·3 knots ; Completed, 1899-1900 ;
Armament, 4—12 in., 14—6 in., 20—12 pr., 12 small.

See page 221.

Tango *late* Poltava.



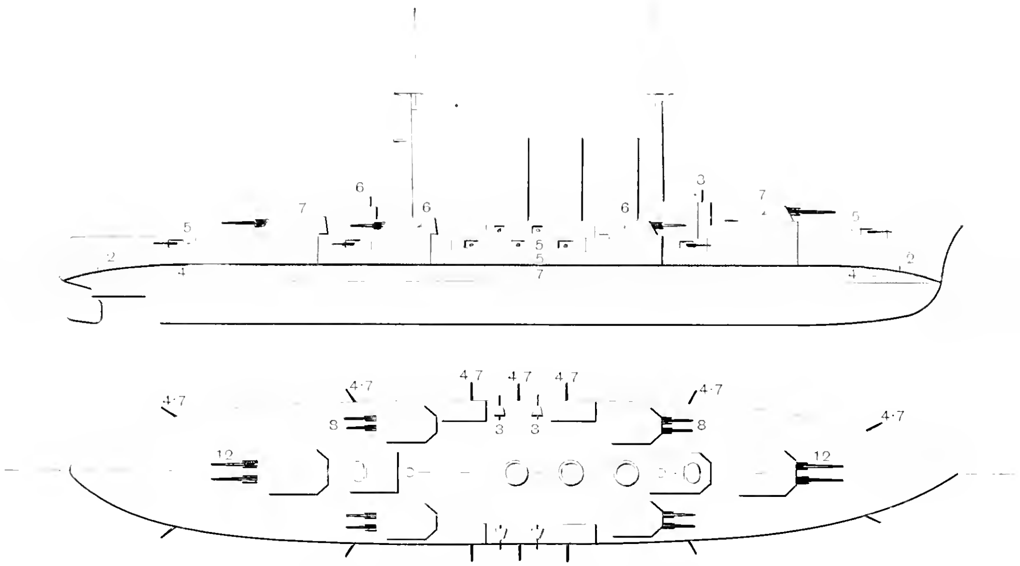
Length, 367 ft. ; 10,960 tons ; Speed, 16 knots ; Completed, 1898.
Armament, 4—12 in., 12—5·9 in., 14 small.

See page 223.

JAPAN.

ARMOURED CRUISERS.

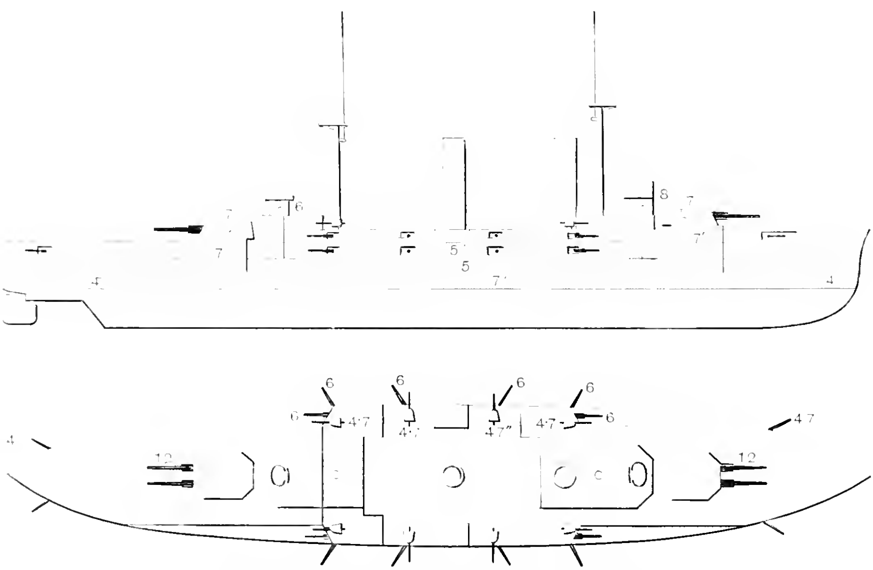
Ibuki. Kurama.



Length, 450 ft.; 14,620 tons; Speed, 22 knots; Ibuki, Completed, 1909; Kurama, Completed, 1911; Armament, 4—12 in., 8—8 in., 14—4·7 in., 9 small.

See page 221.

Ikoma. Tsukuba.



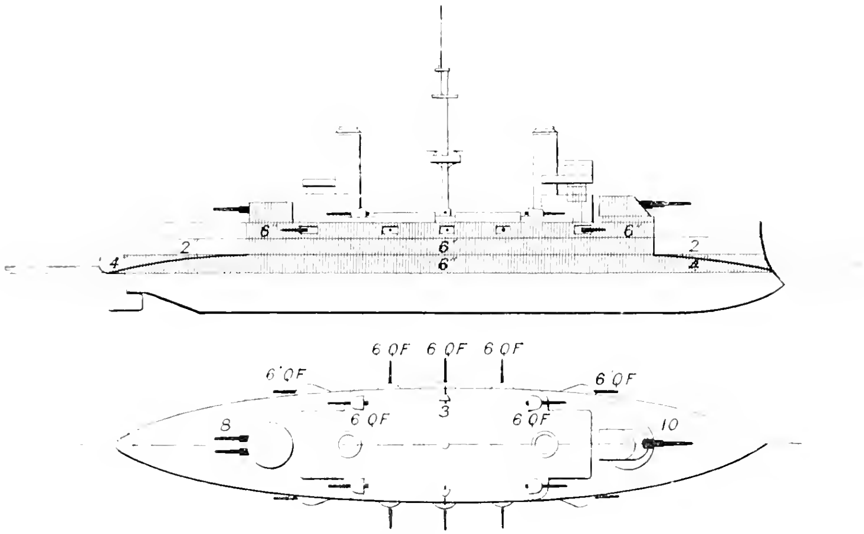
Length, 440 ft.; 13,750 tons; Speed, 21 knots; Completed, 1907; Armament, 4—12 in., 12—6 in., 12—4·7 in., 8 small.

See page 221.

JAPAN.

ARMOURED CRUISERS.

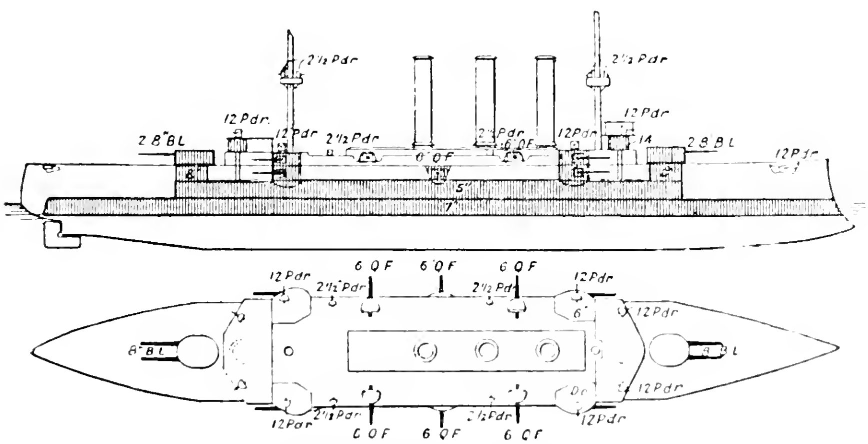
Kasuga. **Nisshin.**



The Nisshin has 2–8 in. guns in fore barbette.

Length, 344 ft. ; 7289–7700 tons ; Speed, 20 knots ; Completed, 1904 ;
Armament, 1–10 in., 2–8 in., 14–6 in., 10–3 in., 8 small.

Idzumo. ***Adzuma.** **Iwati.** ***Yakumo.**



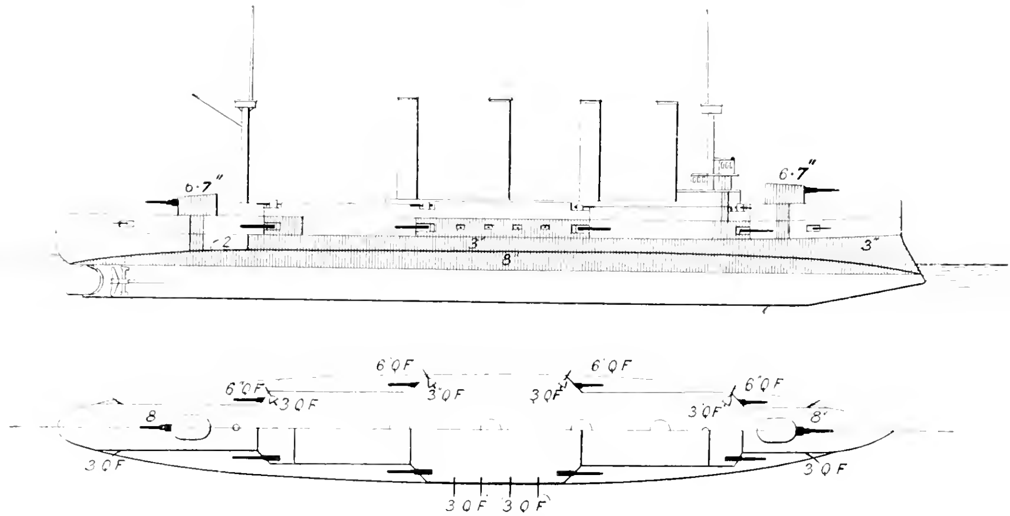
Length, 400–434 ft. ; 9436–9850 tons ; Speed, 20–22 knots ; Completed, 1901 ;
Armament, 4–8 in., 14–6 in., 12–12 pr., 8 small.

*12–6 in. guns.

See page 221.

ARMOURED CRUISERS.

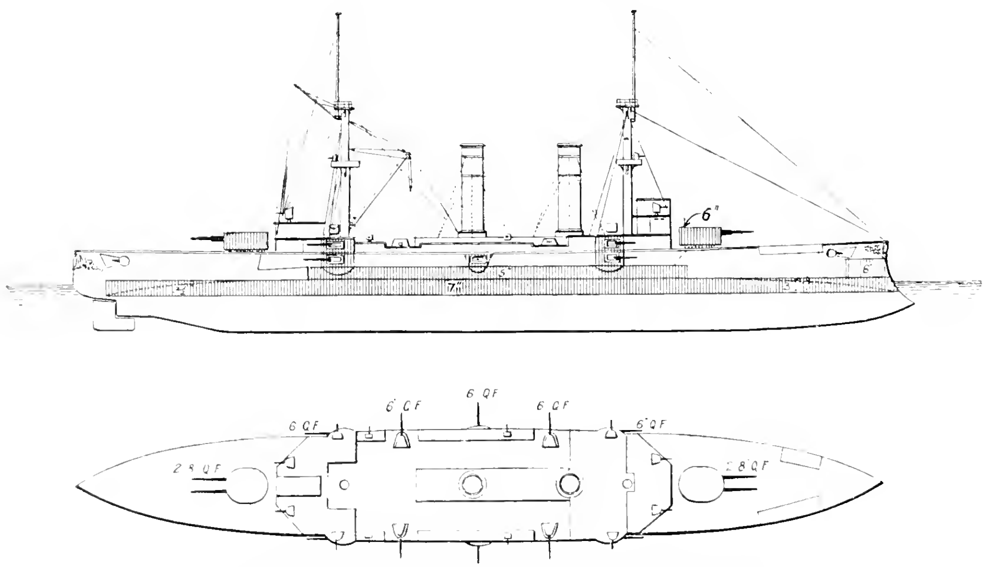
Aso *late* Bayan.



Length, 443 ft. ; 7726 tons ; Speed, 22 knots ; Completed, 1902 ;
Armament, 2—8 in., 8—6 in., 32—3 in., 29 small.

See page 221.

Asama. Tokiwa.



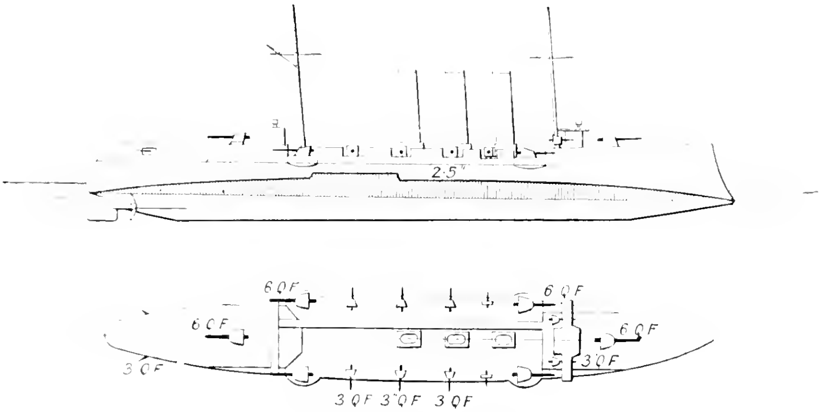
Length, 408 ft. ; 9700 tons ; Speed, 22·1—23 knots ; Completed, 1899 ;
Armament, 4—8 in., 14—6 in., 12—12 pr., 8 small.

See page 221.

JAPAN.

CRUISERS

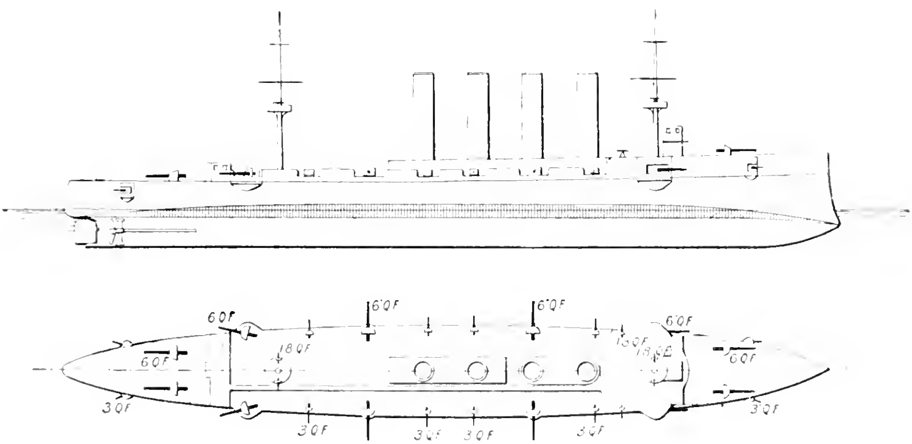
Niitaka. **Tsushima.**



Length, 235 ft. ; 3365 tons ; Speed, 20 knots ; Completed, 1904–5 ;
Armament, 6—6 in., 10—3 in., 4 small.

See page 224.

Sōya *late* **Waryag.**



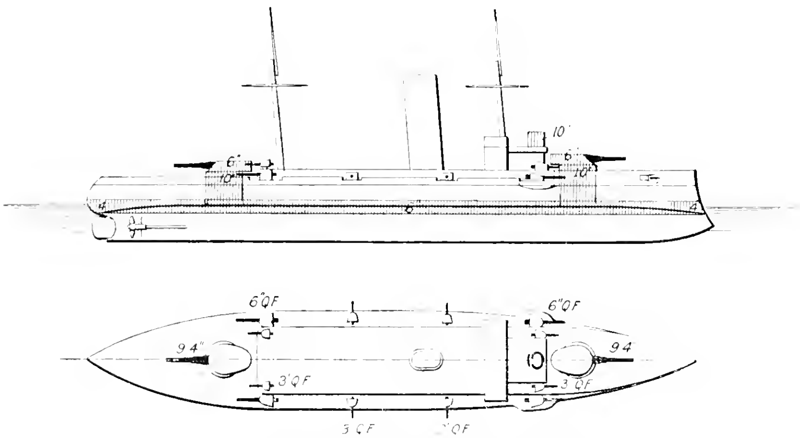
Length, 420 ft. ; 6500 tons ; Speed, 23 knots ; Completed, 1900 .
Armament, 12—6 in., 12—12 pr., 6 small.

See page 225

NETHERLANDS.

COAST DEFENCE SHIPS.

De Ruyter. Hertog Hendrik. Koningin Regentes. Marten Tromp.



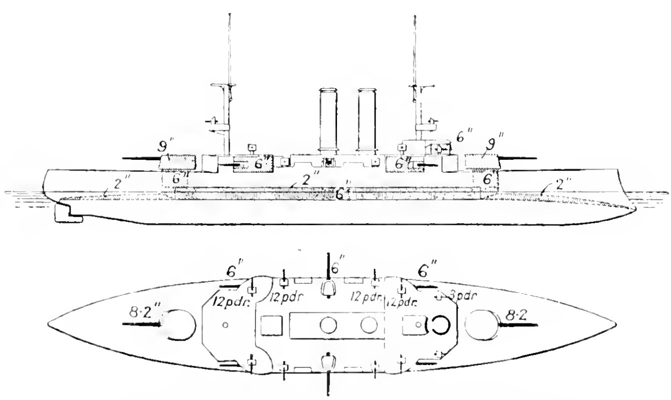
Length, 317 ft. ; 5014—5211 tons ; Speed, 16·5 knots ; Completed, 1902—1906 ;
Armament, 2—9·4 in., 4—6 in., 10—3 in., 4 small.

See page 226.

NORWAY.

COAST DEFENCE SHIPS.

Norge. Eidsvoid.



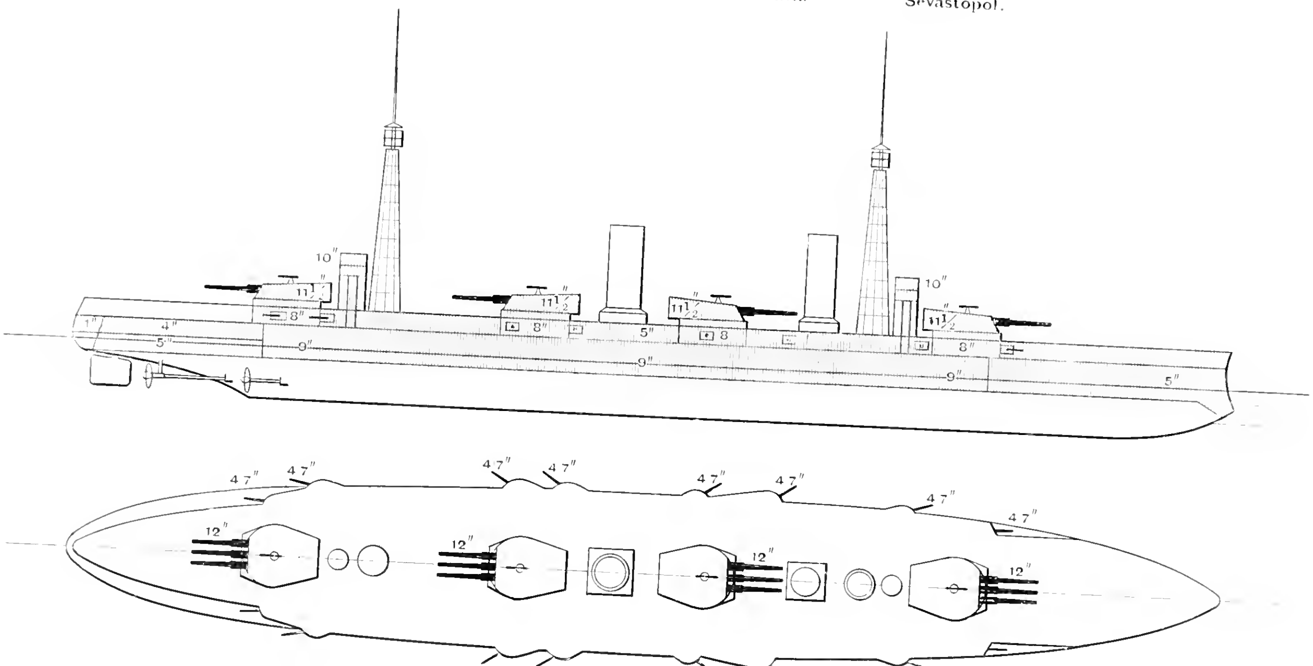
Length, 290 ft. ; 3847 tons ; Speed, 16·5 knots ; Completed, 1901 ;
Armament, 2—8·2 in., 6—6 in., 8—12 pr., 6 small.

See page 228.

RUSSIA.

BATTLESHIPS.

Gangut. Petropavlovsk. Poltava. Sevastopol.



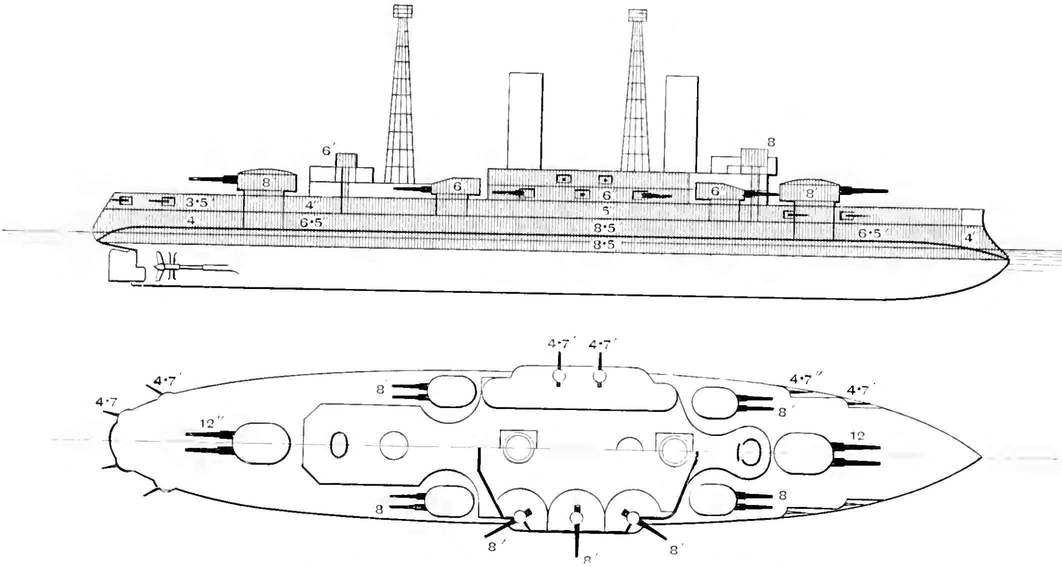
Length, 590 ft. ; 23,000 tons ; Speed, 23 knots ; Building ;
Armament, 12—12 in., 16 4·7 in. 4—3 pr.

See page 230.

RUSSIA.

BATTLESHIPS.

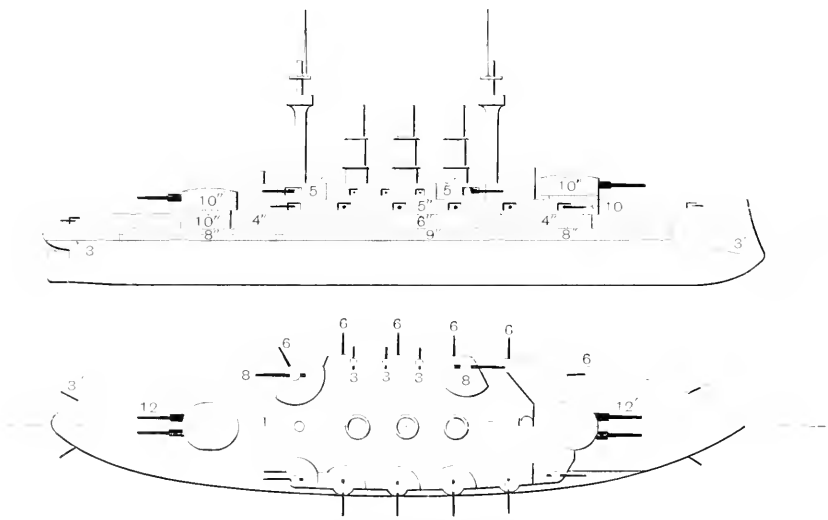
Andrei Pervozvannyi. **Imperator Pavel.**



Length, 430 ft. ; 17,200 tons ; Speed, 18 knots ; Completed, 1910 ;
Armament, 4—12 in., 14—8 in., 20—4·7 in.

See page 230

Evstafi. **Ioann Zlatoust.**



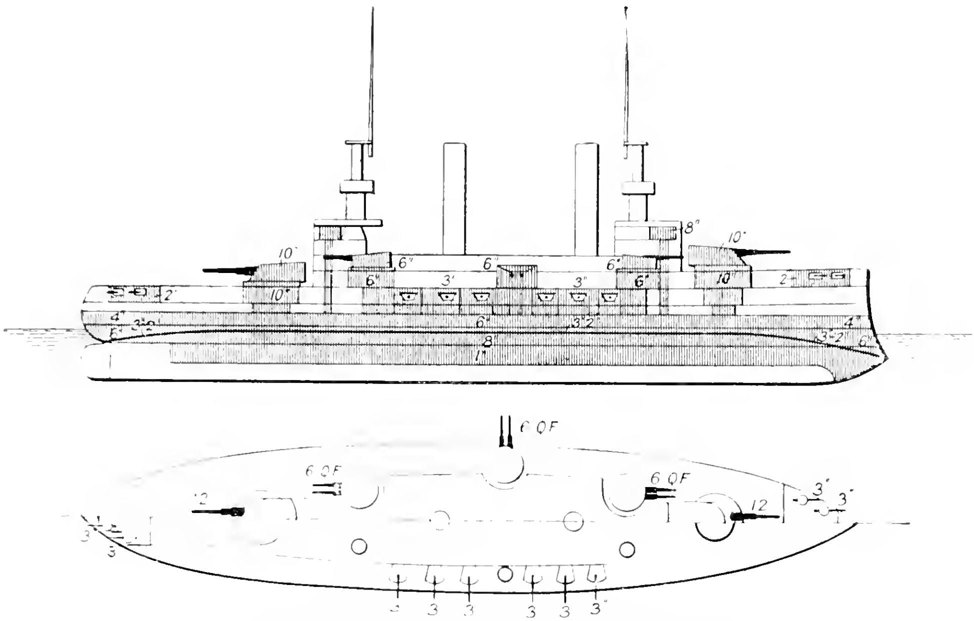
Length, 372 ft. ; 12,733 tons ; Speed, 16 knots ; Evstafi, Completed, 1911 ; Ioann Zlatoust, Building ;
Armament, 4—12 in., 4—8 in., 12—6 in., 14—3 in., 18 small.

See page 230.

RUSSIA.

BATTLESHIPS.

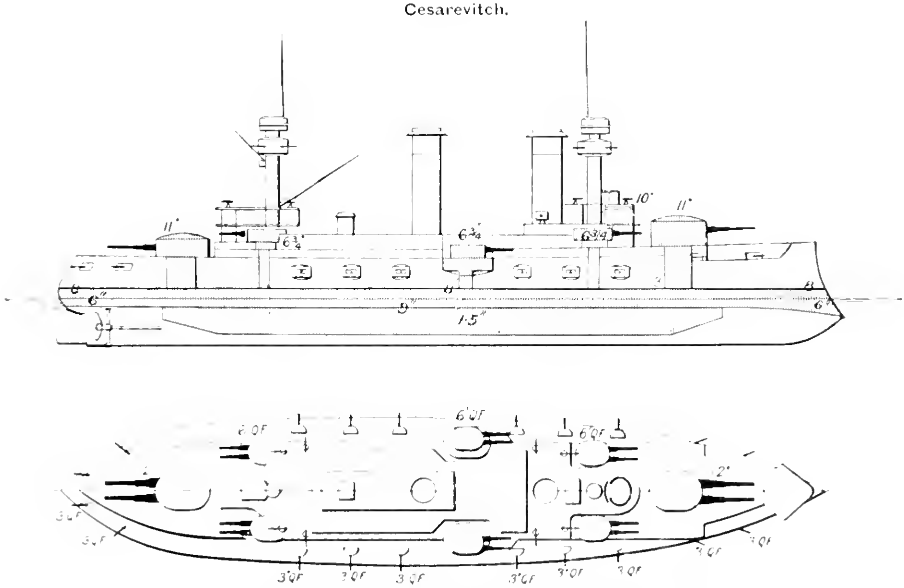
Slava.



Length, 367 ft. ; 13,516 tons ; Speed, 18 knots ; Completed, 1906 ;
Armament, 4—12 in., 12—6 in., 20—3 in., 26 small.

See page 231.

Cesarevitch.



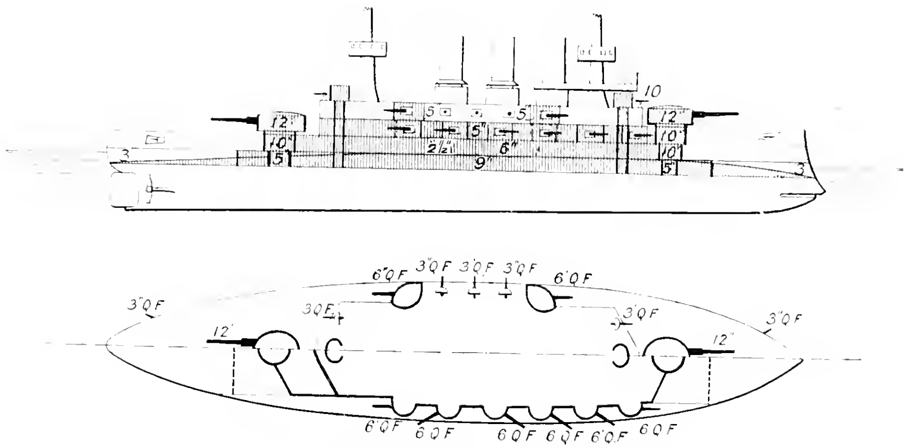
Length, 389 ft. ; 12,912 tons ; Speed, 19.6 knots ; Completed, 1902 ;
Armament, 4—12 in., 12—6 in., 20—3 in., 32 small.

See page 230

RUSSIA.

BATTLESHIPS.

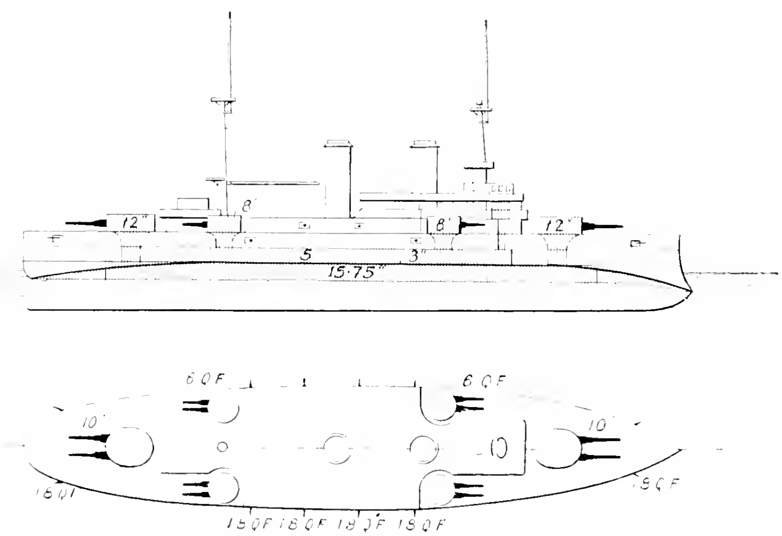
Panteleimon, *ex* Kniaz Potemkine Tavritchesky.



Length, 372 ft.; 12,480 tons; Speed, 17 knots; Completed, 1902;
Armament, 4—12 in., 16—6 in., 14—3 in., 28 small.

See page 231

Rostislav.



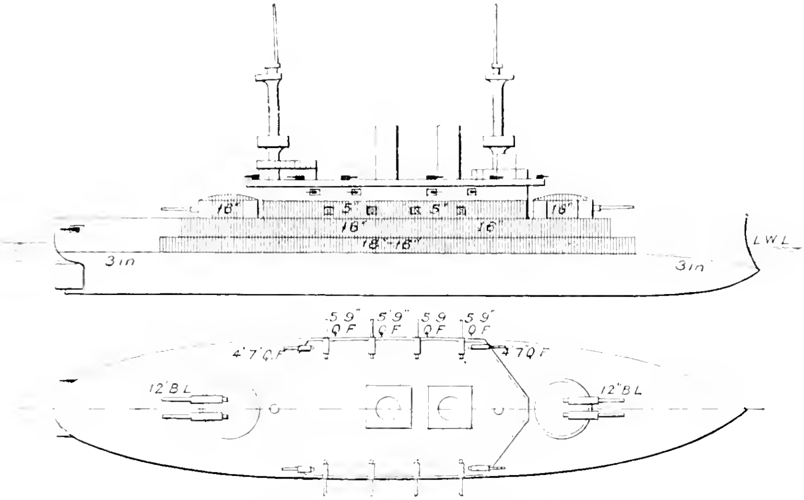
Length, 341 ft.; 8880 tons; Speed, 16 knots; Completed, 1899;
Armament, 4—10 in., 8—6 in., 18 small.

See page 231

RUSSIA.

BATTLESHIPS.

Tria Sviatitelia.

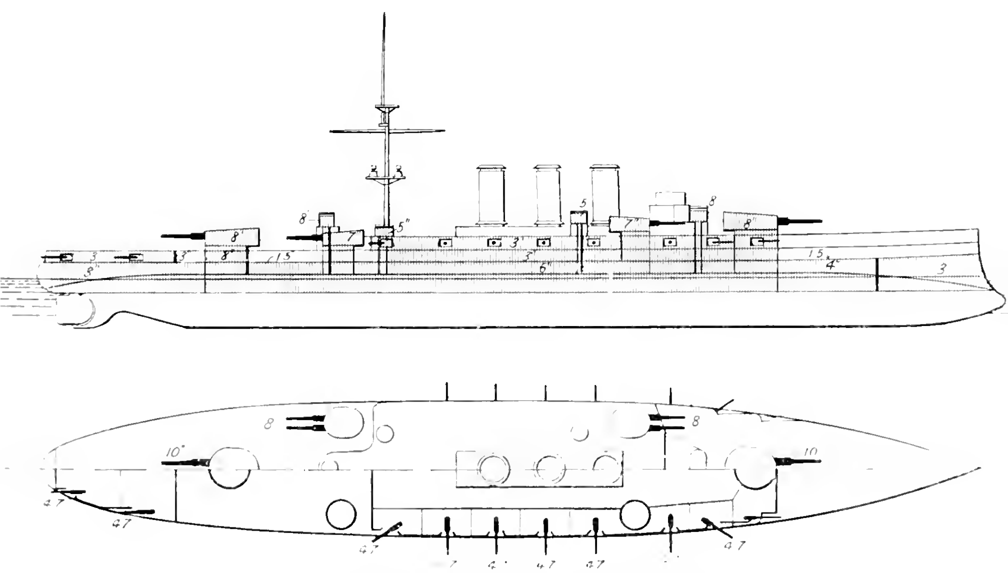


Length, 357 ft. ; 13,318 tons ; Speed, 18 knots ; Completed, 1896 ;
Armament, 4—12 in., 8—5·9 in., 4—4·7 in., 50 small.

See page 231.

ARMOURED CRUISERS.

Rurik.



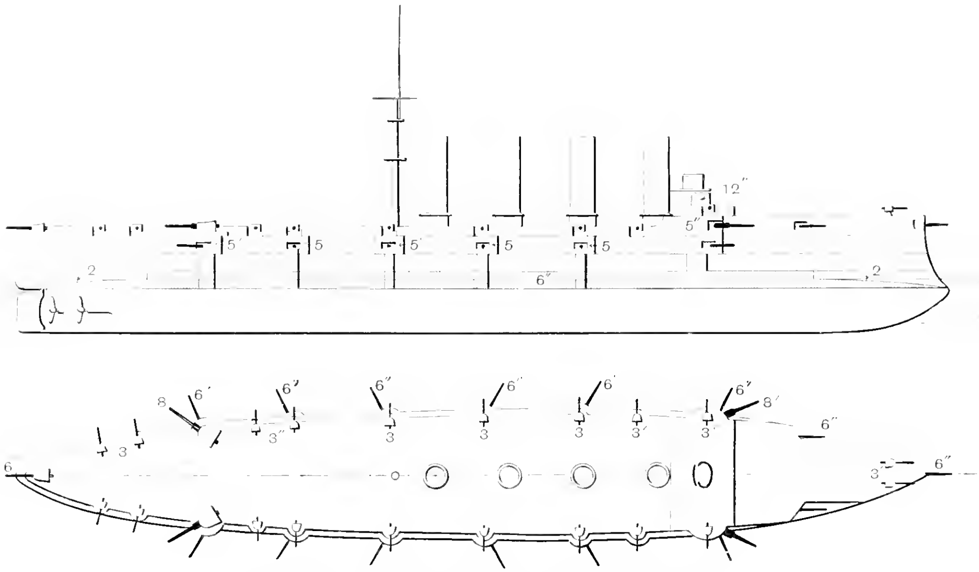
Length, 490 ft. ; 15,170 tons ; Speed, 21 knots ; Completed, 1907 ;
Armament, 4—10 in., 8—8 in., 20—4·7 in., 12 small.

See page [illegible]

RUSSIA.

ARMOURED CRUISERS.

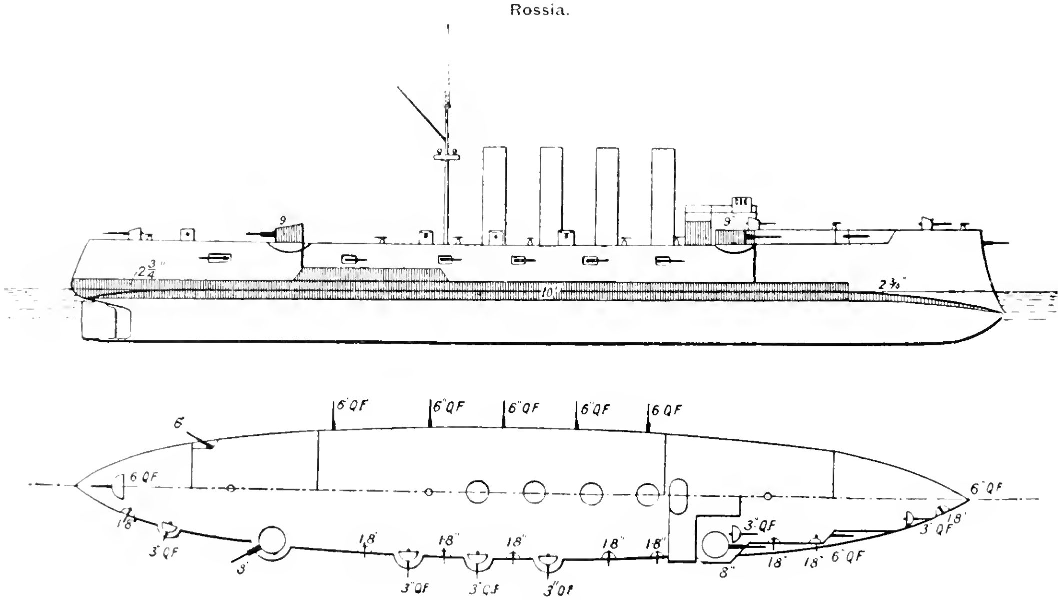
Gromoboi.



Length, 473 ft. ; 12,336 tons ; Speed, 20 knots ; Completed, 1900 ;
Armament, 4—8 in., 16—6 in., 20—3 in., 20 small.

See page 230.

Rossia.



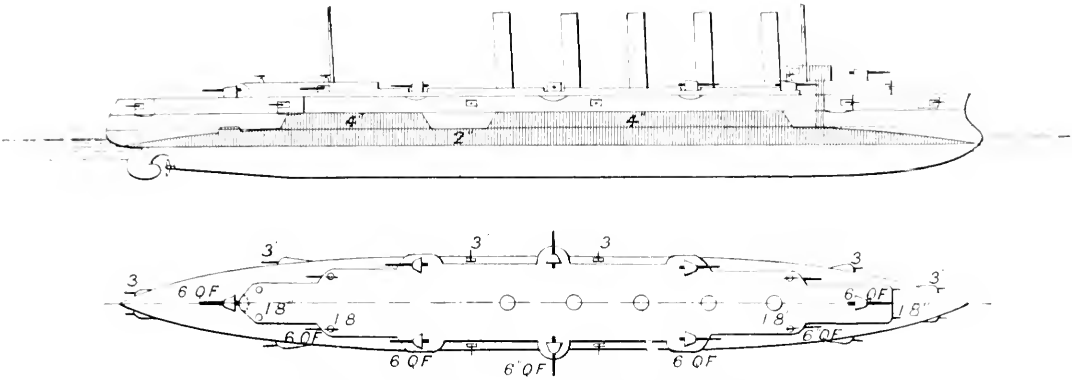
Length, 480 ft. ; 12,130 tons ; Speed, 20 knots ; Completed, 1898 ;
Armament, 4—8 in., 16 6 in., 12—3 in., 20 small.

See page 231.

RUSSIA

CRUISERS

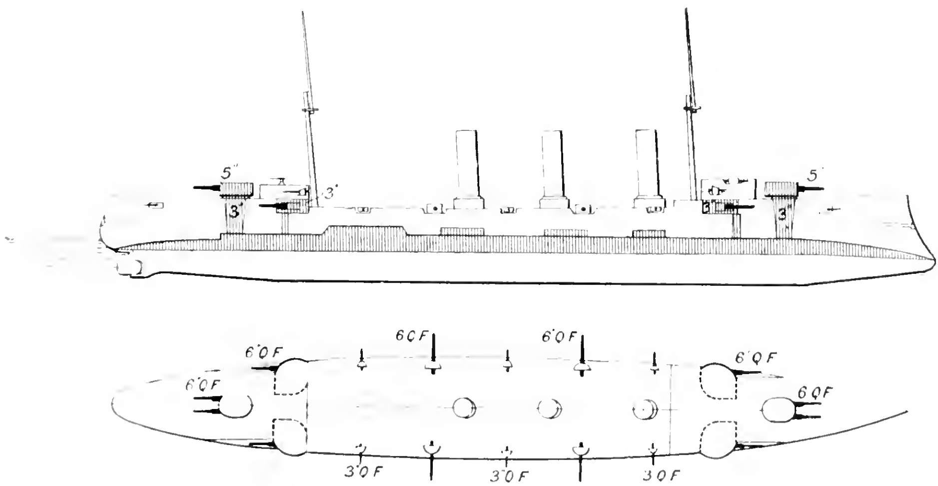
Askold.



Length, 426 ft. ; 5905 tons ; Speed, 23·8 knots ; Completed, 1901 ;
Armament, 12—6 in., 12—3 in., 12 small.

See page 232.

Bogatyr. **Oleg.**



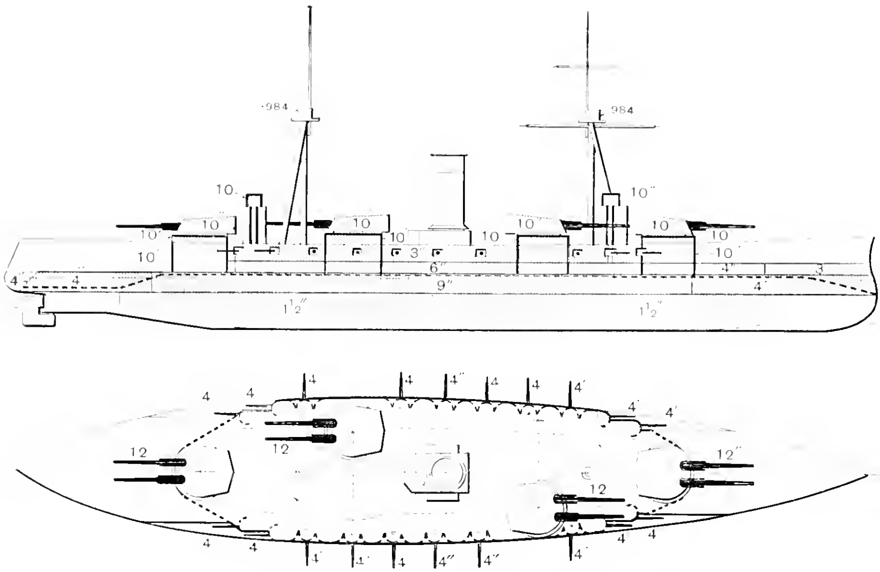
Length, 417–440 ft. ; 6645–6675 tons ; Speed, 23–24 knots ; Completed, 1902–1904 ;
Armament, 12–6 in., 12–3 in., 10 small.

See page 232

SPAIN.

BATTLESHIPS

Alphonso XIII. España. Jaime I.

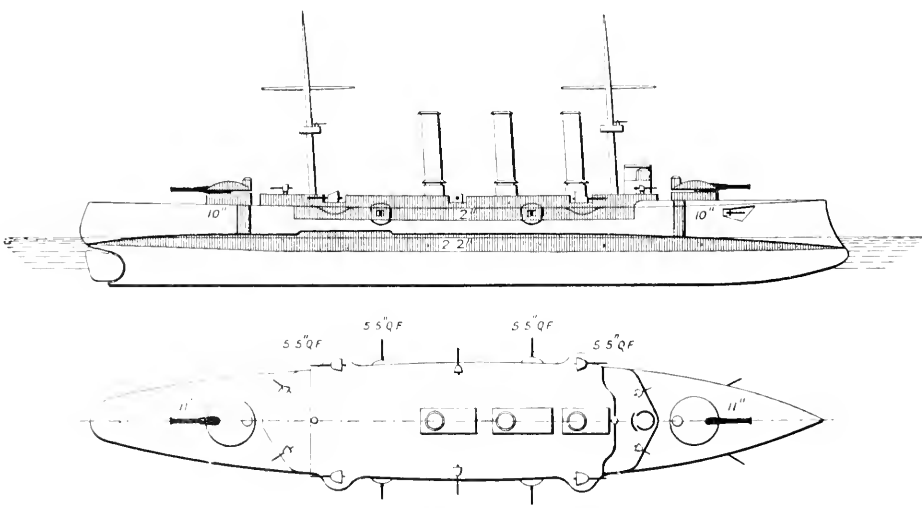


Length, 435 ft. ; 15,460 tons ; Speed, 19·5 knots ; Building ;
Armament, 8—12 in., 20—4 in., 6 small.

See page 234.

ARMOURED CRUISER.

Emperador Carlos V.



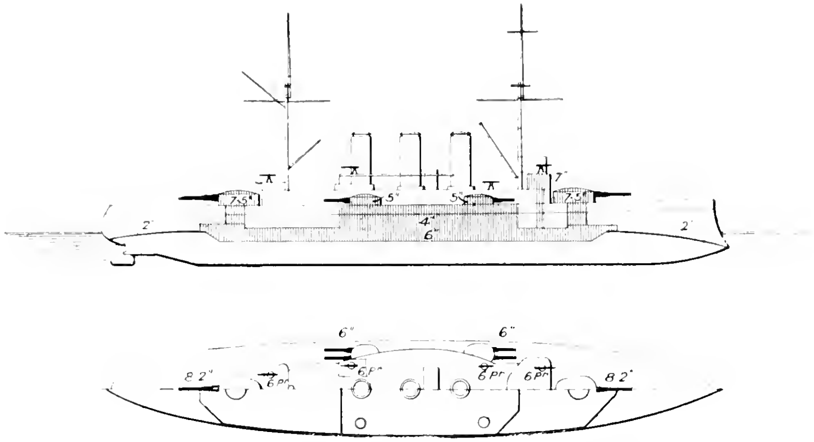
Length, 380 ft. ; 9089 tons ; Speed, 20 knots ; Completed, 1898 ;
Armament, 2—11 in., 8—5·5 in., 4—3·9 in., 12 small.

See page 234.

SWEDEN.

BATTLESHIP.

Oscar II.

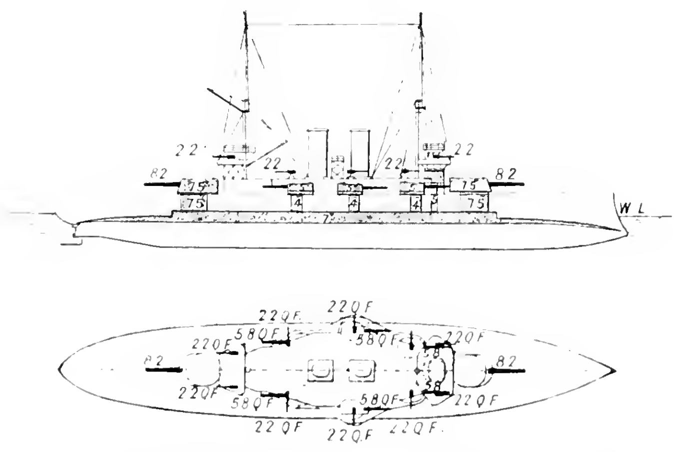


Length, 314 ft. ; 4203 tons ; Speed, 18 knots ; Completed, 1907 ; Armament, 2—8·2 in., 8—6 in., 14 small.

See page 236.

COAST DEFENCE SHIPS.

Aeran. Manligheten. Tapperheten. Wasa.



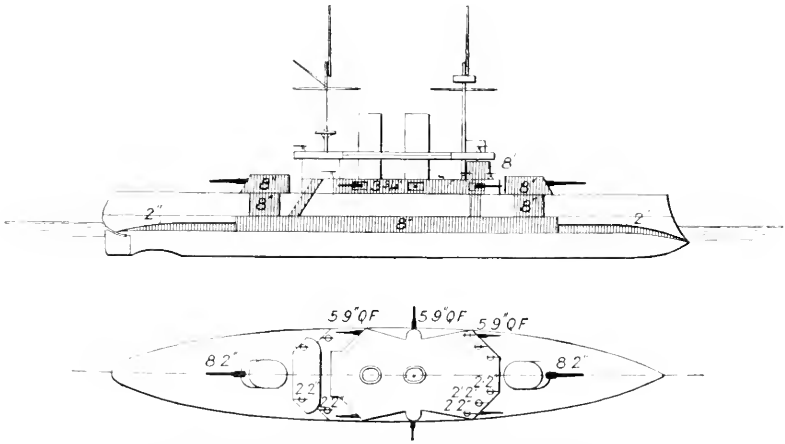
Length, 287 ft. ; 3612 tons ; Speed, 16·5–17·2 knots ; Completed, 1901–1908 ; Armament, 2—8·2 in., 6—5·8 in., 14 small.

See page 236.

SWEDEN.

COAST DEFENCE SHIP.

Dristigheten.

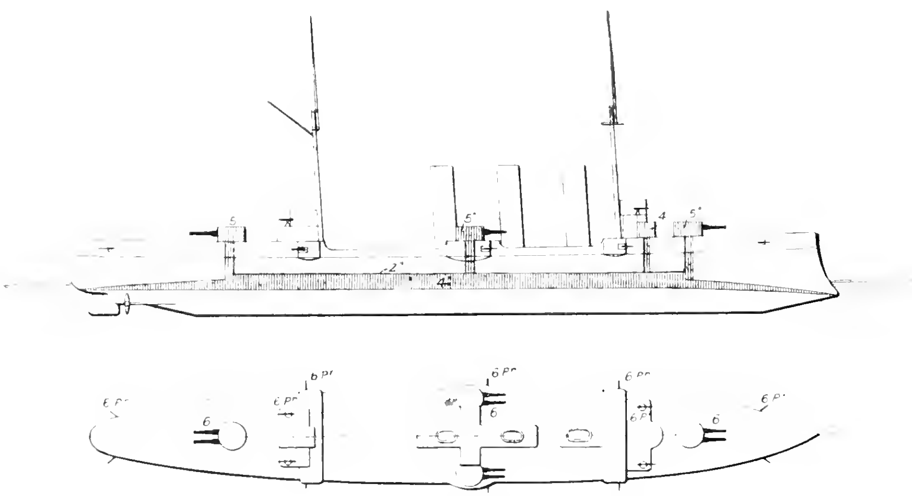


Length, 285 ft. ; 3445 tons ; Speed, 16·5 knots ; Completed, 1901
Armament, 2—8·2 in., 6—5·9 in., 12 small.

See page 236.

ARMOURED CRUISER.

Fylgia.



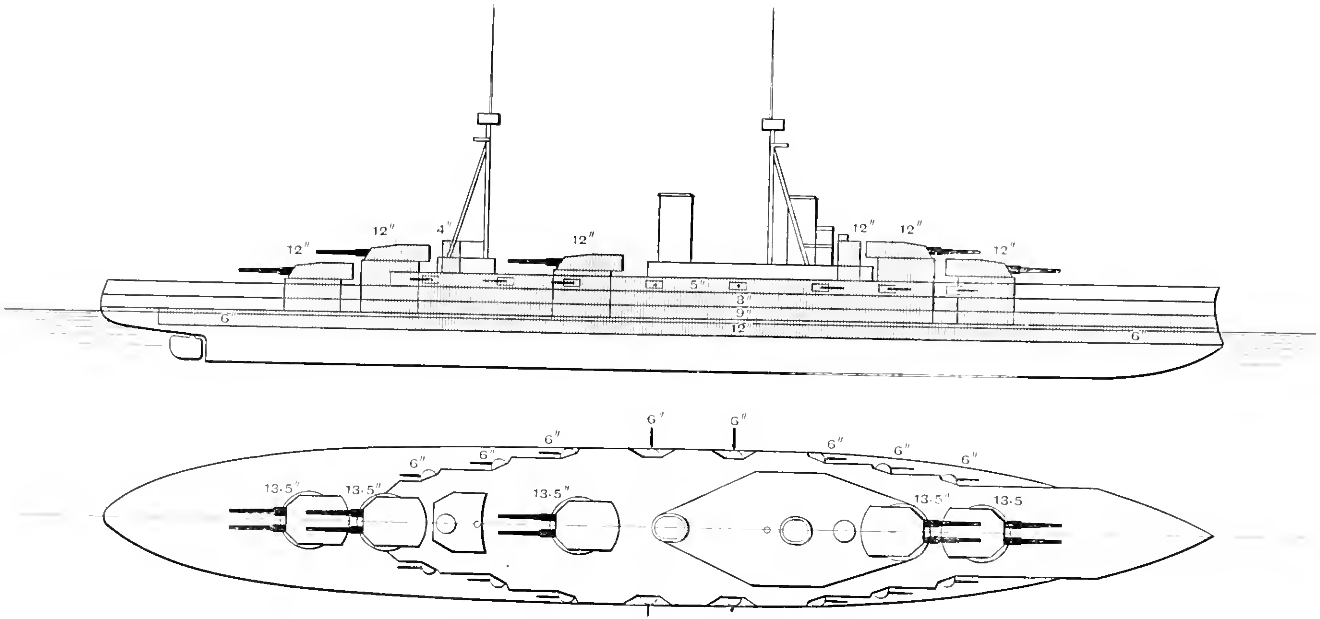
Length, 377 ft. ; 4100 tons ; Speed, 22·5 knots ; Completed, 1907 ;
Armament, 8—6 in., 17 small.

See page 236.

TURKEY.

BATTLESHIPS.

Reschad-i-Hamiss. Reschad V.



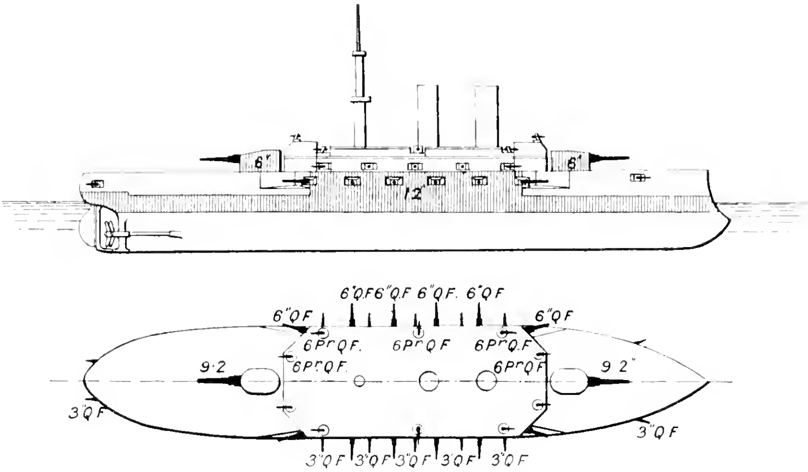
Length, 525 ft. ; 23,000 tons ; Speed, 21 knots ; Building ;
Armament, 10—13·5 in., 16—6 in.

See page 238.

TURKEY

BATTLESHIP.

Messoudieh.

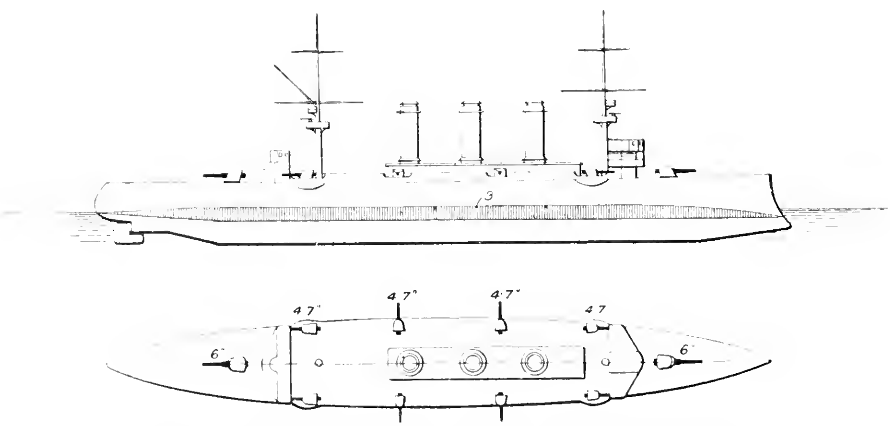


Length, 331 ft. ; 9120 tons ; Speed, 17·5 knots ; Completed, 1901 ;
Armament, 2—9·2 in., 12—6 in., 14—3 in., 14 small.

See page 238.

CRUISERS.

Abdul Hamid. Medjidieh.



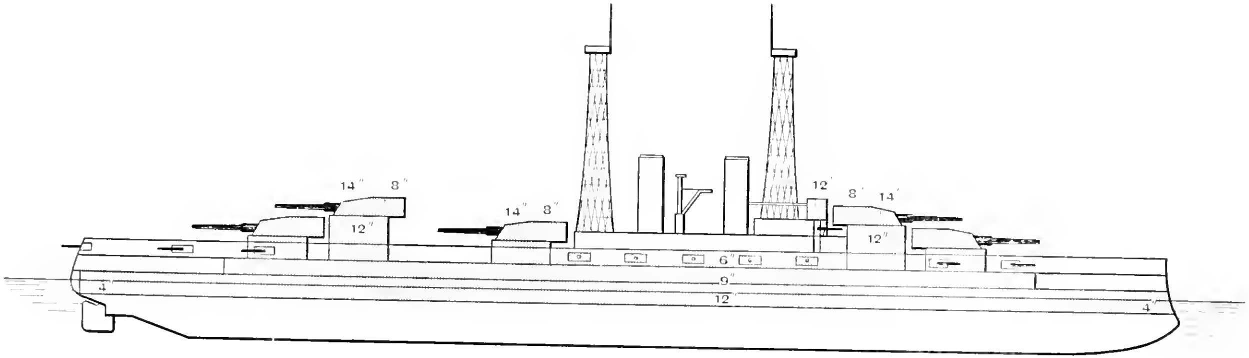
Length, 331—340 ft. ; 3432—3800 tons ; Speed, 22·2 knots ; Completed, 1904 ;
Armament, 2—6 in., 8—4·7 in., 12 small.

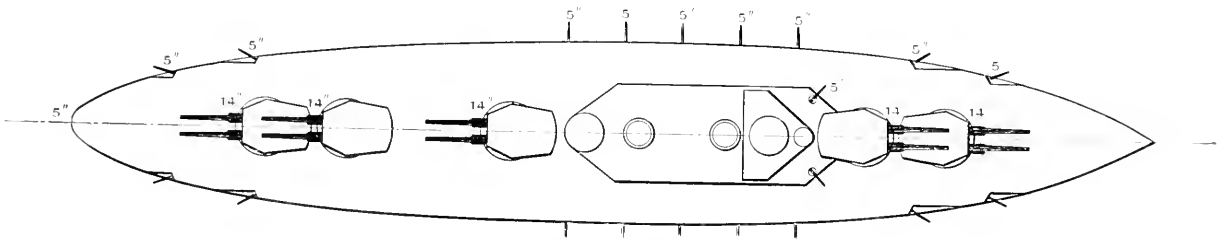
See page 238.

UNITED STATES.

BATTLESHIPS

New York, Texas.





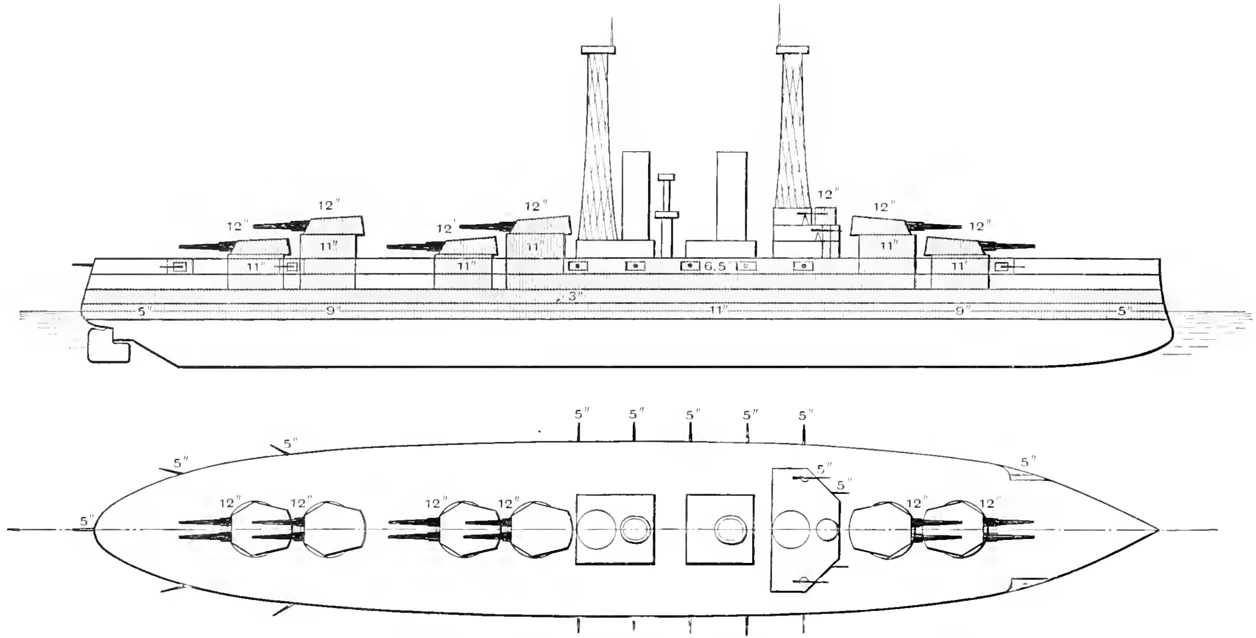
Length, 573 ft. ; 27,000 tons ; Speed, 21 knots ; Building ; Armament, 10—**14** in., 22—5 in.

See page 241.

UNITED STATES

BATTLESHIPS.

Arkansas. **Wyoming.**



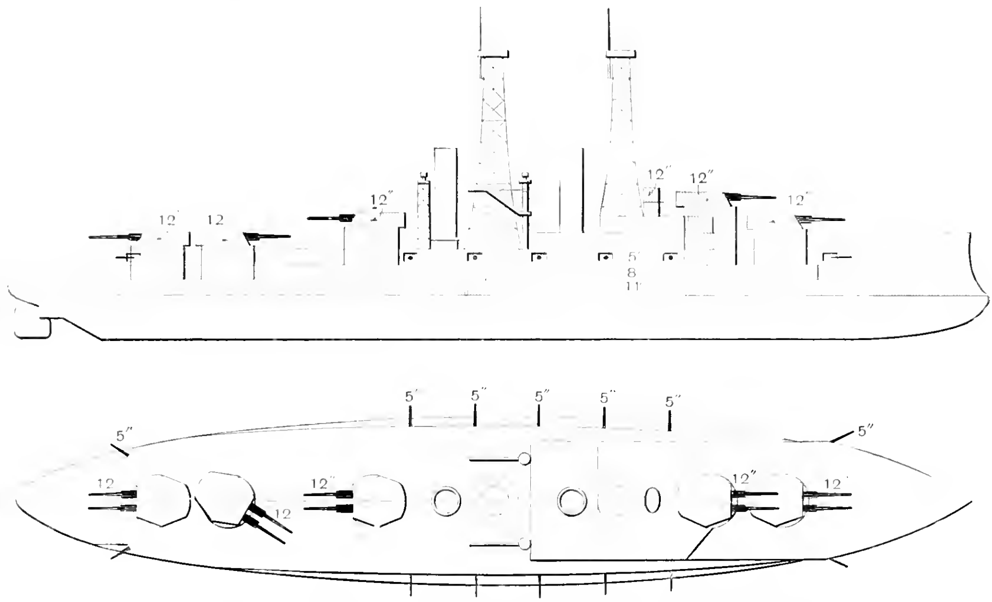
Length, 554 ft. ; 26,000 tons ; Speed, 20·5 knots ; Building ;
Armament, 12—12 in., 21—5 in., 4—3 pr.

See page 239.

UNITED STATES.

BATTLESHIPS.

Delaware. North Dakota. Florida. Utah.

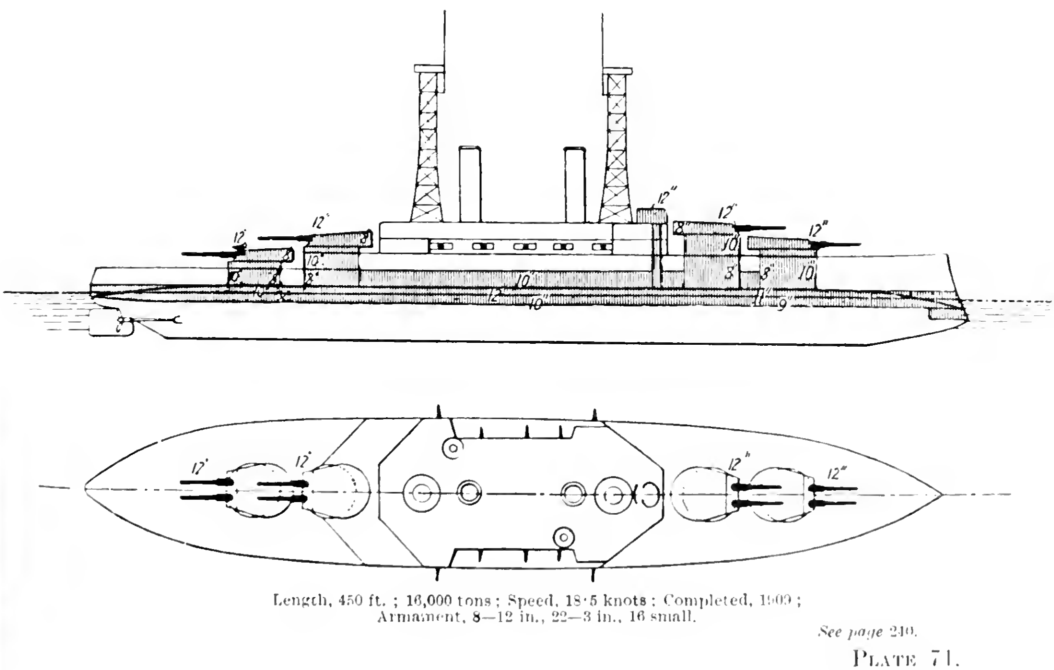


Delaware } Length, 510 ft. ; 20,000 tons ; Speed, 21·5 knots ; Completed, 1910 ;
North Dakota } Armament, 10—12 in., 14—5 in., 16 small.

Florida } Length, 510 ft. ; 21,825 tons ; Speed, 21 knots ; Completed, 1911 ;
Utah } Armament, 10—12 in., 16—5 in., 10 small.

See page 239.

Michigan. South Carolina.



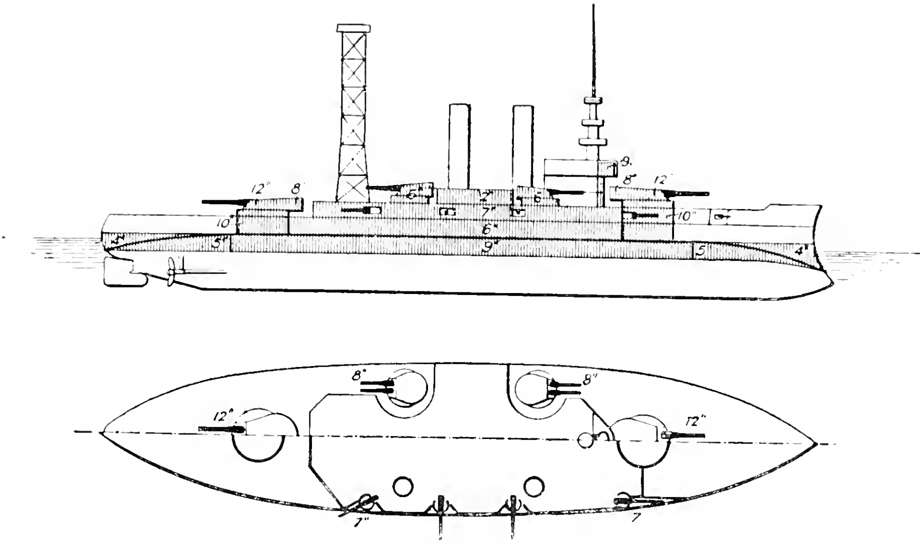
Length, 450 ft. ; 16,000 tons ; Speed, 18·5 knots ; Completed, 1909 ;
Armament, 8—12 in., 22—3 in., 16 small.

See page 240.

UNITED STATES.

BATTLESHIPS.

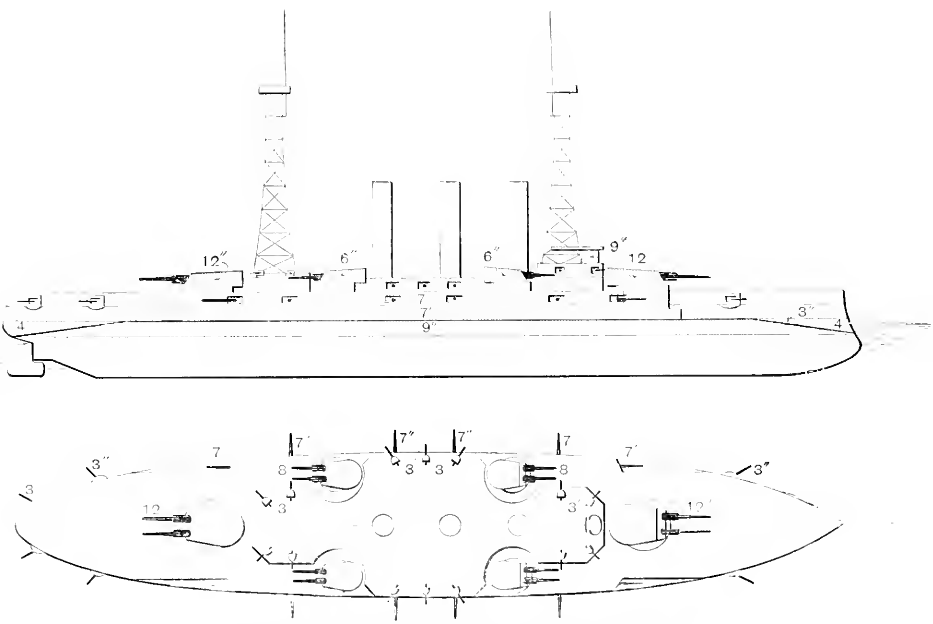
Idaho. Mississippi.



Length, 375 ft. ; 13,000 tons ; Speed, 17 knots ; Completed, 1909 ;
Armament, 4—12 in., 8—8 in., 8—7 in., 12—3 in., 20 small.

See page 239.

Connecticut. Kansas. Louisiana. Minnesota. New Hampshire. Vermont.



Length, 450 ft. ; 16,000 tons ; Speed, 18·1—18·8 knots ; Completed, 1906–1908 ;
Armament, 4—12 in., 8—8 in., 12—7 in., 20—3 in., 30 small.

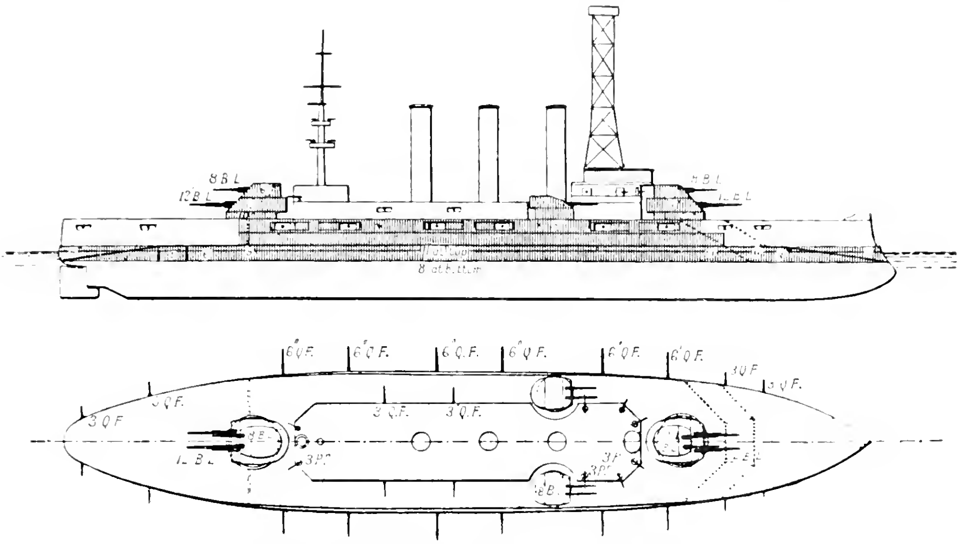
Connecticut and Louisiana have 11 in. belt instead of 9 in., and have only 2—3-in. guns at the stern. New Hampshire has two military masts in place of the towers. Minnesota has one mast and one tower.

See page 239.

UNITED STATES.

BATTLESHIPS.

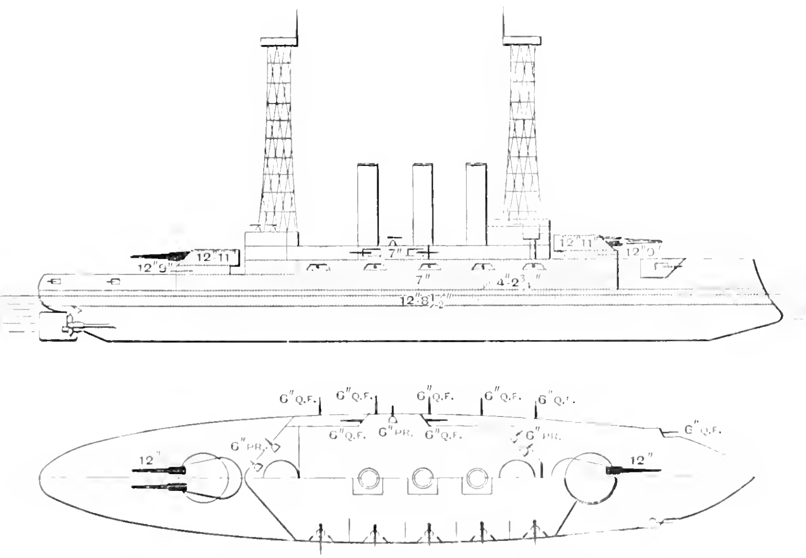
Georgia. Nebraska. New Jersey. Rhode Island. Virginia.



Length, 435 ft. ; 14,948 tons ; Speed, 19—19·4 knots ; Completed, 1905-1906 ;
Armament, 4—12 in., 8—8 in., 12—6 in., 12—3 in., 30 small.

See page 239.

Maine. Missouri. Ohio.



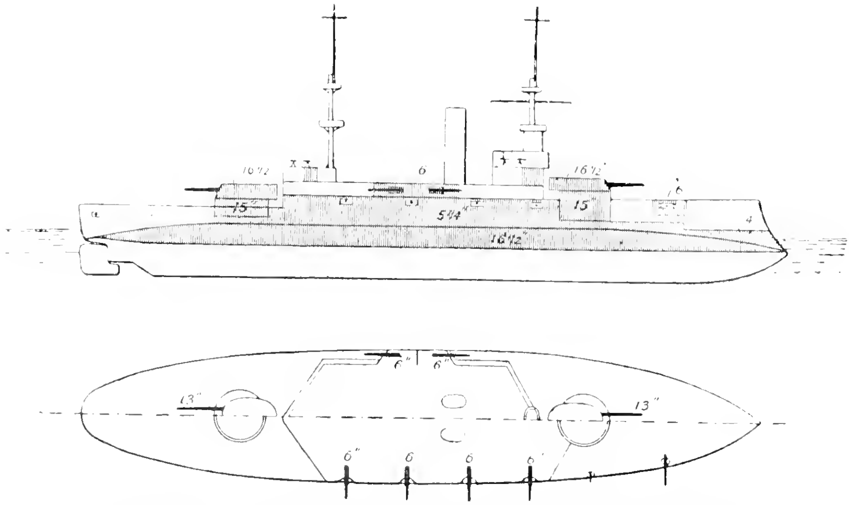
Length, 388 ft. ; 12,300—12,440 tons ; Speed, 17·8—18·1 knots ; Completed, 1902-1904
Armament, 4—12 in., 16—6 in., 6—3 in., 18 small.

See page 240.

UNITED STATES.

BATTLESHIPS.

Alabama. Illinois. Wisconsin.

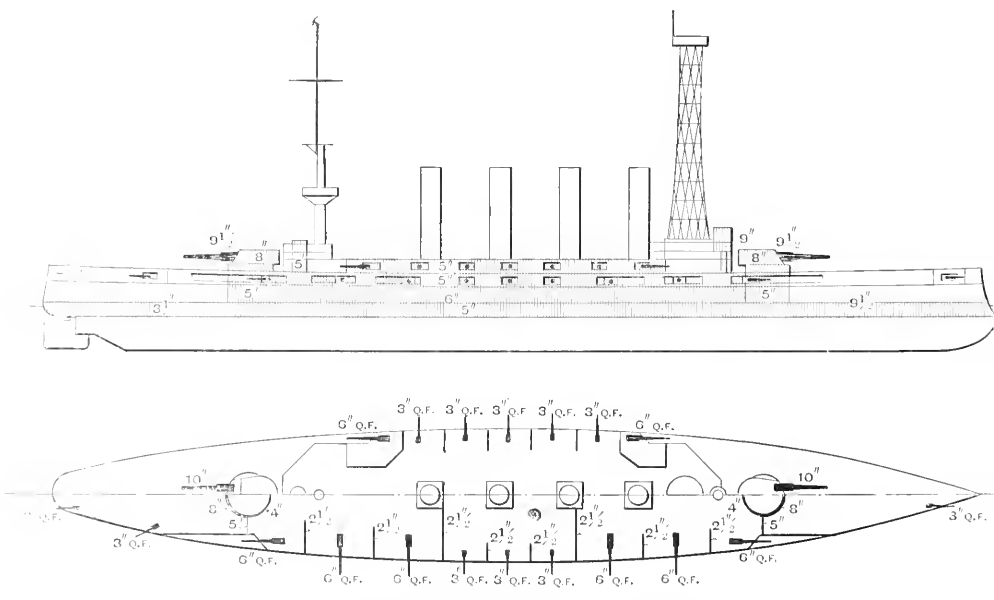


Length, 368 ft. ; 11,565—11,653 tons ; Speed, 17—17·45 knots ; Completed, 1900-1901 ;
Armament, 4—13 in., 14—6 in., 24 small

See page 239.

ARMOURED CRUISERS.

Montana. North Carolina. Tennessee. Washington.



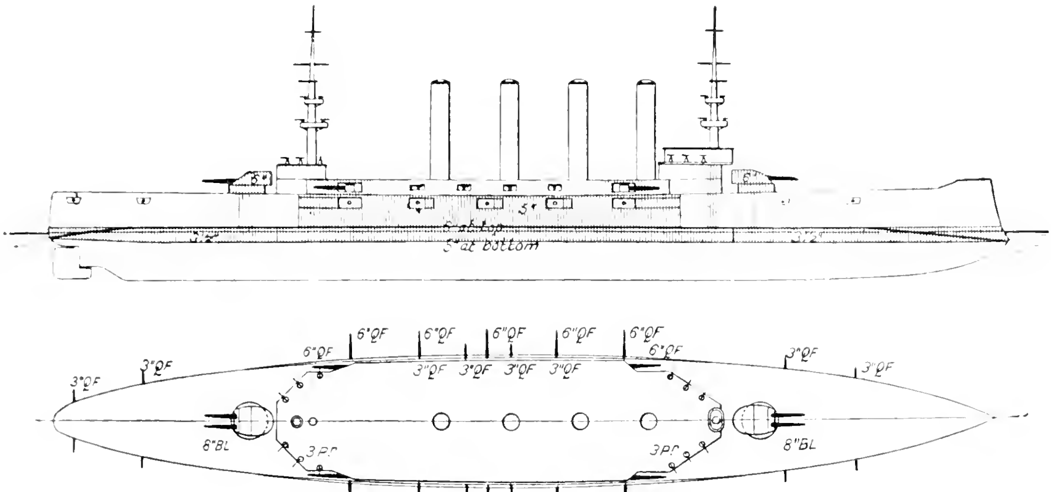
Length, 502 ft. ; 14,500 tons ; Speed, 22—22·8 knots ; Completed, 1906-1908 ;
Armament, 4—10 in., 16—6 in., 22—3 in., 22 small.

See page 240.

UNITED STATES.

ARMOURED CRUISERS.

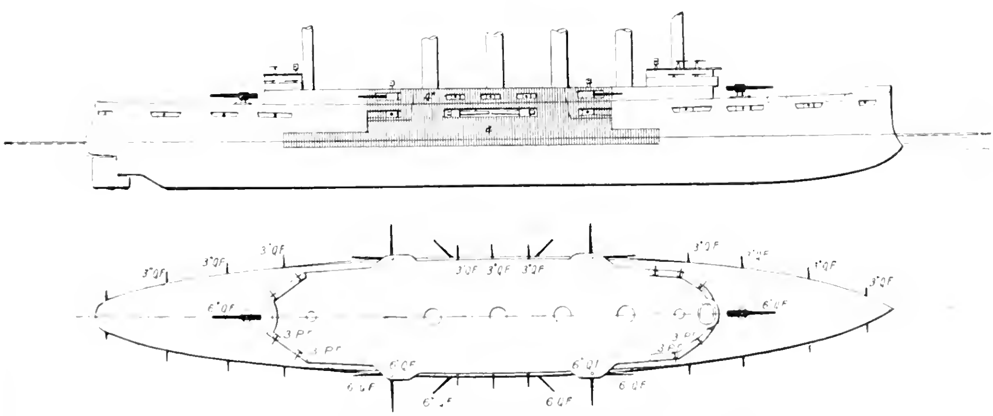
California. Colorado. Maryland. Pennsylvania. South Dakota. West Virginia.



Length, 502 ft.; 13,680 tons; Speed, 22—22·4 knots; Completed, 1905-1907;
Armament, 4—8 in., 14—6 in., 18—3 in., 30 small.

See page 239.

Charleston. Milwaukee. St. Louis.



Length, 424 ft.; 9700 tons; Speed, 22—22·3 knots; Completed, 1906;
Armament, 14—6 in., 18—3 in., 36 small.

See page 239.

PART III.

ARMOUR AND ORDNANCE.

PART III.

ARMOUR AND ORDNANCE.

In making a survey of armour and ordnance matters for the past year, there is apparent, at first glance, what may be described as a period of marking time; but this is not to say that there has been no advance, for such a state of things it is impossible to contemplate. The progress made, however, has been mainly in the development and improvement of existing war material, and effectively the onward movement has not exhibited itself to any considerable extent, either in the increased resistance or changed disposition of armoured protection, in the greater calibre or improved power of the weapons, or in variations in the design and type of completed vessels. There have been none of the revolutionary changes which at different periods in the past have surprised and disturbed those who are interested in the production or use of naval war appliances. Nor are there now any clear indications of novel or sensational movements in the immediate future. In guns of about 13·5-in. calibre, all the Powers seem to have found the heaviest weapon for the principal armament of big battleships and cruisers, but the tendency is still to increase rather than to reduce weight. Similarly, a gun of about 6-in. calibre is now generally regarded as the most useful weapon for the battery which was primarily installed for protection against torpedo attack, but also may at certain ranges be used in fleet action. Improvements in armour have not given this means of protection any unexpected advantage in its contest with the gun. Recent practice points to a further spreading of armoured protection rather than to any material increase in its thickness. The fact that the advocates for a reduction of weight in this direction are again making their voices heard is a point to be noted. But although modification rather than innovation is the prevailing characteristic of the advance made both in attack and defence, the increased range of the torpedo—for which equality with the gun is now claimed—the larger sea-keeping powers and effectiveness of the submarine, as well as the rapid strides towards efficiency made with the aeroplane, all betoken uncertainty in the time to come, and these causes of unrest

General progress.

must prepare naval men, manufacturers and constructors alike for approaching developments and impending changes of importance.

Research work.

At no time in the history of modern armaments has so much research work been undertaken than has been the case recently, and it may also be said that at no time has the development been of so great importance and influence alike in the power, rapidity of firing, and reliability of guns of all calibres. The firms engaged in the production of the material for naval war are continuously prosecuting experiment, and if all information were available, the story they could disclose would form a most instructive chapter in connection with modern artillery for naval, coast defence, and field work. And as it is with the gun so it is with the projectile, the torpedo, and other accessories and adjuncts of naval warfare. Unfortunately the bonds of secrecy increase apparently almost in direct ratio with the value of the information which could be disclosed. The British Government and the foreign Powers for which these firms are doing important work compel them to conform to binding conditions to secure secrecy, and in the interests of patriotism the public must rest satisfied with the assurance that the Admiralty is securing the best that ingenuity and experience and unrestricted expenditure on experiment can give. There is, however, a tangible proof of superiority in the circumstance that many Powers are adopting the specialities and inventions of British firms, and to this extent also the industry and enterprise of the great companies which manufacture war material must be of economic advantage to the nation.

In his Statement Explanatory of the Navy Estimates for the current year, the First Lord refers to the satisfactory rate at which the manufacture of guns is proceeding, to the good progress made in other directions in regard to ordnance material, and to the constant and earnest attention which the development of the torpedo and the methods of controlling fire are receiving. The high standard of shooting in the Fleet has been maintained, and the reports of battle practice and gunlayers' trials which have been issued show that the advance of late years continues, and on very similar lines. There has been a further approximation of battle practice conditions to the probabilities of action, conjoined with quite remarkable progress in the matter of scientific record, analysis, and examination of results. This, it must be acknowledged, is the best method of arriving at weak points in the gunnery system, obtaining an explanation of them, and thus reaching the absolutely correct remedies. It is essential to get a clear idea of the character of the fault, if it is to be put right, and this is exactly where the recent methods of trial and record are bound to be productive of

Shooting of the Fleet.

advantageous result. Nor should it pass without notice here that much progress has been made in the direction of battle practice with torpedoes since this exercise was introduced a few years ago. It is now developing into a thorough test of the organisation and use of the torpedo in action.

A Tactical Staff.

At the present moment, when attention is directed to the institution of a reorganised and reconstituted War Staff, and the object and purpose of the changes recently made are so widely discussed, it seems to be a favourable opportunity for suggesting that it is illogical to supply a Strategical Staff without its natural complement in the naval service, a Tactical Staff also. Strategy may be studied at the War College, but tactics must be taught at sea, and therefore every officer who is entrusted with a command afloat might be encouraged to report fully on all methods and experiments in tactical movements which take place under his eye or commend themselves to his notice. A Tactical Staff at the Admiralty or at the War College might receive these reports, and after collating, comparing, and criticising them, the results could be summarised, and submitted afresh to the Service at sea for further consideration and trial. As it is the weapons that influence tactics, or should do so, the Inspector of Target Practice, as the officer most closely in touch with the competence of the Fleet in gunnery, its methods and management, should be brought into the counsels of the authorities at the Admiralty and War College to advise on these reports, and suggest further tests and experiments based upon them. The members of the Tactical Staff engaged in this work should include, and perhaps be mainly chosen from, officers who have specialised in gunnery, torpedo, and submarine work. Again, as tactics are influenced by the weapon so design should be influenced by tactics, and thus it follows that the studies and deductions of the Tactical Staff should be discussed by the head of the War College and the Inspector of Target Practice, with the Chief of the Staff, in order to make sure that the foundation of all proposed changes in the design of new ships should rest on sea experience, and be examined in the light of the most recent developments in tactics, these in their turn depending upon the progress made by the Fleet in the use and application of the weapons supplied to it.

The Inspector of Target Practice.

The introduction of the Inspector of Target Practice as an official adviser of the War Staff, which must occur in practice, even if it be not nominally the case, may remind readers of the *Naval Annual* of some remarks pertinent to this matter which appeared in last year's issue. It was then pointed out that, under the guidance of Sir Arthur Wilson, the tendency, already manifest in the time of Lord

Fisher, to divide gunnery administration into two branches—making the Director of Naval Ordnance the Board's adviser as to material, and the Inspector of Target Practice the Board's adviser as to its utilisation—had shown a distinct advance, and that the value of this step had been demonstrated in many ways. It appears to be a point well worth consideration and discussion whether this differentiation of functions might not now be definitely established. In this case, the Inspector of Target Practice would become the chief of the gunnery staff, while the Director of Naval Ordnance would be the officer responsible for the provision of armaments. Mr. Winston Churchill, when introducing the Navy Estimates on March 18, referred to an inquiry into the methods of training and testing the officers and men in what he called "this supreme and paramount service," the gunnery of the Fleet, which had just been completed; and it is noteworthy that he has devoted much time since he came into office as First Lord to personal investigation at sea of the conditions in which the gunnery practices and trials are carried out. It is only natural, therefore, that he should realise to the fullest extent how essential it is there should be a special staff for the constant study of the methods of gunnery, as obtained from the experience of the Fleet, and the manner in which the results should make their influence felt in other branches of naval administration. The nucleus of an organisation for such a staff already exists in the gunnery officers attached to the ships of the principal admirals afloat as flag-commanders, and those in the office of the Inspector of Target Practice. Little more is needed than to subject the existing institution to a similar treatment in the way of expansion and reorganisation to that which the Naval Intelligence Department has recently undergone. The training establishments at the ports and the officers now at the Admiralty who deal with questions of gunnery practice, the development of fire-control, and such problems as are connected with the use of guns, torpedoes and other weapons, would then pass under the control of the Inspector of Target Practice; he would be called to the War Council, and the Board would look to him for advice on everything that pertained to gunnery methods and progress. There would then be a fourth or gunnery division to the War Staff, the assistant director of this division being charged with similar duties in relation to torpedo work.

Large calibre guns.

The past year has been notable for the increased favour with which the large calibre guns are viewed, and it may now be said that the 12-in. 50-cal. gun is no longer regarded by any Power as the most desirable weapon in ships of the line. In the British Service the 13·5-in. 45-cal. gun has completely supplanted it, and

in several foreign navies the 14-in. 45-cal. gun is now favoured; it remains to be seen whether either the British or foreign Powers will be satisfied with these weapons or adopt still larger ones. There is, to begin with, the great advantage of the increased size of projectile with its augmented bursting charge, and the consequent enormous addition to the destructive force and the area of the danger zone within any ship after the shot has penetrated the armour. As is now well known, the projectile of the 12-in. gun is of 850 lb. weight, that for the 13·5-in. 1250 lb., for the 14-in. 1488 lb., and for the 15-in. 1950 lb. It may be accepted that the weight of the bursting charge contained within the armour-piercing shell of these respective guns increases in greater proportion than the weight of the missile itself. The destructive force of the explosive contents is the dominant aim rather than the extent of penetration. Already the 12-in. gun is quite satisfactory from this latter point of view, even at the greatest ranges within the possibilities of the vision of the gunner. Thus the penetration of hardened steel armour plate at 3000 yards, according to the Gavre formula, is 22·2-in. with the 12-in. 50-cal. gun, and is only increased to 25½-in. for the 15-in. 45-cal. gun, using the largest projectile already named.

Bursting charges.

There is, however, the undoubted advantage that higher penetration and greater destruction within the ship is achieved with a considerably reduced muzzle velocity in the larger calibre guns, and, consequently, the life of the gun is very much prolonged, as wear and tear and erosion increase with velocity. As will be seen from the Table of Ballistics of Vickers' guns, published on page 357, the muzzle velocity of the 12-in. 50-cal. gun is over 3000 f.s.; for the 13·5-in. gun 2700 f.s., for the 14-in. gun 2525 f.s., and for the 15-in. gun 2500 f.s. These figures alone indicate that the larger weapon will have a much longer life, and that, for a given duty, the cost must be considerably less than in the case of the 12-in. or even of the 13·5-in. gun.

The weight of the projectile increases greatly the muzzle energy developed, even with the reduced initial velocities, and thus there is manifest a steady increment, particularly marked in the case of the 15-in. gun. The energy given for the 12-in. weapon is 53,400 f.t., for the 13·5-in. 63,190 f.t., for the 14-in. gun 65,790 f.t., and for the 15-in. gun 84,510 f.t. It becomes interesting to note the development in the muzzle energy per ton of weight of gun. In the case of the most powerful 12-in. gun it is 811 f.t., for the 13·5-in. 830 f.t., for the 14-in. gun 820 f.t., and for the 15-in. gun 880 f.t. per ton weight of gun.

In considering the efficiency of these large calibre guns, however,

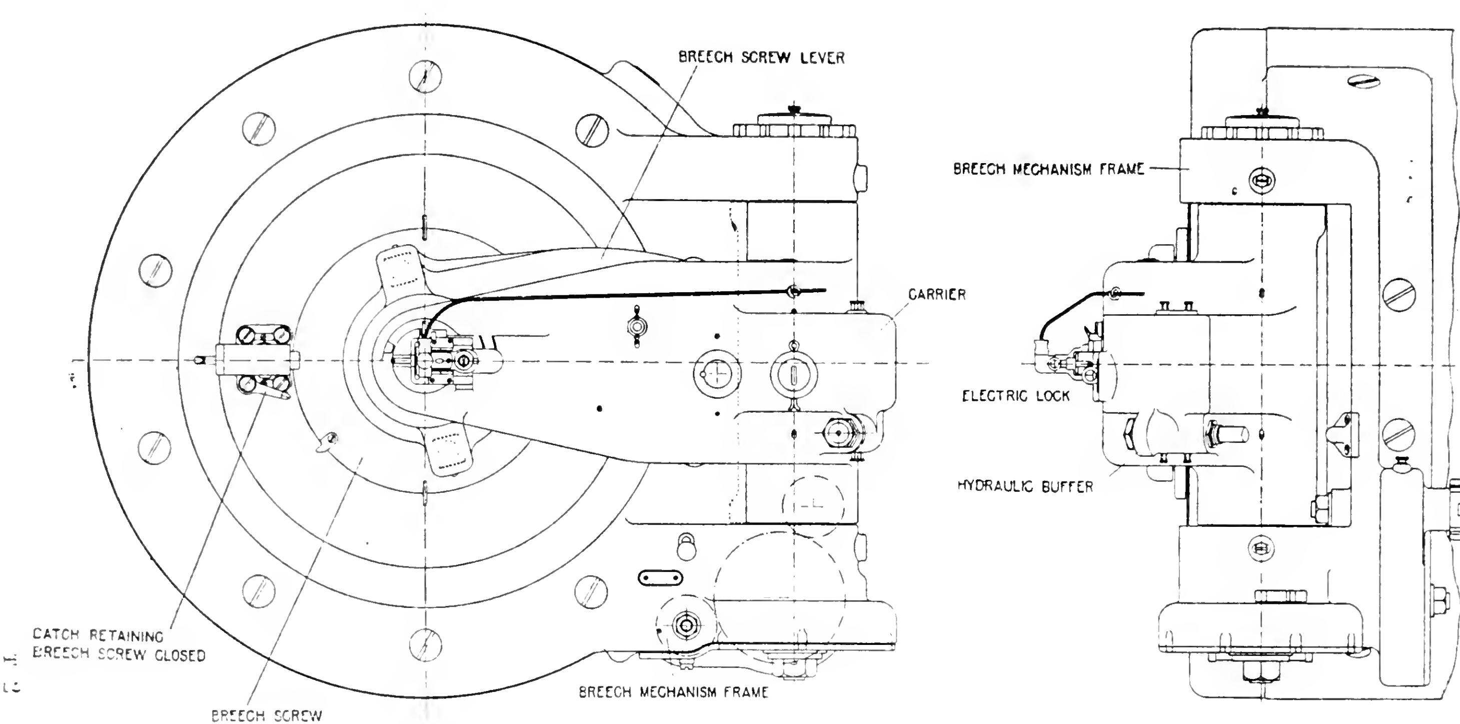
it is necessary to take into account the rapidity and accuracy of fire. In this respect there need be no misgiving. The progress indicated by experimental work, not only in the reduction of the weight of the mechanism and mounting of guns, but also by the improvement of their rapidity and reliability of action, gives good promise of a satisfactory issue on these points. The aimed rounds per minute are only decreased from 2 in the case of the 12-in. 50-cal. gun to 1·2 in the case of the 15-in. 45-cal. gun.

Rate of fire.

To the achievement of this result many improvements in mechanism contribute. One of these may be mentioned as typical. The breech mechanism of the Vickers gun is now much appreciated, and it is not therefore surprising that in the large calibre guns the firm contented themselves with developing along the lines most approved by recent practice. On the opposite page is reproduced a drawing of the breech mechanism for the 15-in. (35·5 cm.) gun. Notwithstanding the extra large breech opening required for this gun, as compared with one of 12-in. bore, the breech mechanism for the former has been so carefully designed as to exceed in weight only very slightly that of the 12-in. gun. In so far as it is possible the parts are standardised and made interchangeable irrespective of the size of the gun. This applies notably to the firing gears. Indeed, Messrs. Vickers have aimed at this unity for all types from the 4-in. upwards. In the larger calibre guns, however, dual control is provided, so that the mechanism can be operated either by power (hydraulic or electric) or by hand gear. The mechanism is so perfect in its details that it can be opened by hydraulic power in four seconds and by hand in seven seconds. The time for closing is practically the same.

Foreign advance.

The further information now available about the new guns of foreign manufacturers shows that the British example of an increase in calibre is being followed by the majority of them. The United States has four battleships actually building which will carry a 14-in. gun, and a 16-in. gun may possibly be mounted in the next battleships to be laid down. In Germany, a 12-in. 50-calibre gun has succeeded the 12-in. 45-calibre gun for the ships of the Kaiser type, and still larger guns of 13·56-in. and 14·96-in. calibre appear in the Krupp list, and may be mounted in the Ersatz-Weissenburg and other ships of the 1911 programme. No doubt if these larger guns had been ready they would have been adopted for the Kaiser class. France has advanced from the 12-in. gun of the Jean Bart class to the 13·4-in. gun of the Bretagne class, while Japan is arming her new battle-cruisers of the Kongo type with a 13·5-in. gun, and has been reported to favour a 15-in. gun for the battleship



VICKERS' ORDNANCE B.L. 15-INCH (35·5 CM.) BREECH MECHANISM.

Fuso, now building at Kure. It is possible, however, that difficulties of manufacture may operate against this intention, but in such a case the guns might, of course, be obtained in another country, for, as will be seen from the tables of the ordnance manufacturers, 15-in. guns have already been adopted by the Vickers firm. Italy found a similar difficulty when desiring to equip the Andrea Doria and Duilio with ten 13·5-in. guns, and has kept to the 12-in. gun instead, because, according to report, neither the Vickers-Terni works nor the Armstrong factories were at the moment in a position to supply guns larger than 12-in. calibre, and the Italian authorities did not wish to go outside the country to obtain them. Guns of 14-in. calibre are being supplied to the Chilian battleship Valparaiso and of 13·5-in. calibre to the Turkish battleship Reshad V., under construction at Elswick and Barrow, but the Brazilian battleship Rio de Janeiro, which was originally to have had guns of 14-in. calibre, will now mount 12-in. guns to the number of fourteen, owing to the desire of the Brazilians to reduce the displacement from 32,000 tons.

Disposition of armament.

There continues to be great diversity of practice in regard to the disposition of the heavy guns in the latest battleships, but the British and American methods of turrets all on the centre-line is coming more into favour, partly, no doubt, because of the advent of the triple turret. There does not appear in the distribution of guns that desire for a maximum efficiency of fire in all directions which for some time seemed to be aimed at. On the contrary, the right ahead and right astern fire has relatively decreased as the desire to obtain the maximum of intensity on the broadside, where the ship offers the largest target, has become more marked. The system of super-posed turrets has given satisfactory results. Although the plan of raising the second forward or second after turret high enough to permit of the gun muzzles passing over the top of the turret before or abaft them allows theoretically of a right ahead or right astern fire, it has been found inexpedient to use this advantage under ordinary conditions. But the higher command given by the raised turrets, and the enlarged arc of fire gained on either bow and quarter for an increased number of guns, is a good enough reason for the system being favoured. Triple turrets have now been adopted by the United States, which is the fourth Power to experiment with this method of increasing gun power at a relatively small increase of weight, but neither Italy, Austria, nor Russia have yet completed a vessel mounting triple turrets. It is true to say that the introduction of the triple turret seems likely to add to the diversity of practice in regard to the number and disposition of the heavy guns

of battleships, because it opens up large possibilities to the designer, especially in the case of a ship with both three-gun and two-gun turrets. Compare, for instance, the Russian or Austrian battleships with twelve 12-in. guns, all triple mounted, with the Brazilian Rio de Janeiro, mounting fourteen 12-in. guns, all twin-mounted, or the Italian battleships with thirteen 12-in. guns, mounted partly on either system.

Triple and twin turrets.

In America there has been no change in the principle of turret distribution, the centre-line method, which has been followed consistently whether eight, ten, or twelve heavy guns were mounted, being adhered to. But an important innovation has been made in regard to the disposal of the guns in the turrets by the decision to adopt the triple turret, though not to the same extent as in some of the European navies. Whereas the Texas and New York, of the 1910 programme, have their ten 14-in. guns in five twin turrets, the Nevada and Oklahoma, of the 1911 programme, have six of their ten 14-in. guns in two triple turrets, and the remaining four in two twin turrets. A compromise has therefore been made between the old and the new systems, and it is reasonable to trace it, at least in part, to a desire to save weight for the additional armoured protection, which is another special feature of the 1911 vessels. It appears that if the United States designers had mounted three guns in each of the four turrets instead of in two only, they would not have been able to increase the armour and still to keep within the limit of displacement fixed by Congress. In the disposition of their turrets, the new American ships resemble the Italian Conte di Cavour, except that the latter has an additional triple turret amidships. One triple turret is placed forward and the other aft, the two twin turrets coming between them, and being raised so that their guns may fire over them.

The Germans have also made an important change from the practice followed in their early Dreadnoughts of mounting only two of six turrets on the centre-line. In the Kaiser class, there are only five turrets instead of six, and three are on the keel line, the other two being placed *en échelon*, that on the port side being aftermost. The new plan is therefore identical with that of the British Neptune. It has a distinct advantage over that which preceded it, in that, while there are two heavy guns less, it enables two more guns to be fired on either broadside. It may be that when particulars of the design of the Ersatz Weissenburg and her sisters are forthcoming they will show that the Germans have followed the further British step of mounting all the turrets on the centre-line. The Kaiser design shows a tendency in this direction.

Centre-line twin turrets only is the method now adopted by France for her three battleships of the 1912 programme—the Bretagne, Lorraine, and Provence—which therefore resemble the British Orion class. This change was a very natural one when the calibre of the guns was increased from 12 in. to 13·4 in. and the number reduced from twelve to ten.

Triple turrets.

There is again a novel departure to be noted in Italy, for this Power, the first to adopt the triple turret, has now developed it to a greater extent than any other Power. The Andrea Doria and Duilio will, it is stated, be armed with fifteen 12-in. guns, in five triple turrets, as compared with the thirteen 12-in. guns, in three triple and two twin turrets, of the Conte di Cavour, and the twelve 12-in. guns, in four triple turrets, of the Dante Alighieri. In each case, the turrets are on the centre-line. The method in the Dante Alighieri is similar to that in the four Austrian Dreadnoughts of the Viribus Unitis class, and the four Russian Dreadnoughts of the Gangut class. It is not known that in the three Russian Dreadnoughts begun last year for the Black Sea any departure has been made from this disposition, all the reports that have yet appeared giving twelve 12-in. guns in four triple turrets on the centre-line.

Japan is following, for her squadron of battle-cruisers of the Kongo type, the example set in the British Lion class, the vessels having eight 13·5-in. guns in twin turrets on the centre-line. In regard to the battleship Fuso, however, neither the number of guns to be carried nor the manner in which they will be disposed has been disclosed.

The two battleships building at Elswick for Chile and Brazil afford an interesting contrast in armament, the Valparaiso, for the former Power, having ten 14-in. guns in twin turrets; the Rio de Janeiro, for Brazil, having fourteen 12-in. guns, also twin mounted. For the former, there could hardly be any doubt that to adopt the plan favoured in most other countries and place all the turrets on the keel line was the best, but the latter must have presented many problems to the designer. Not more than six twin gun turrets had formerly been placed on the centre-line of any battleship, and then only in the case of two vessels for the United States. The alternative plans were to mount five turrets on the middle line and the sixth and seventh either abeam, as in the early British Dreadnoughts, or *en échelon*, as in the Neptune class.

Practice in regard to armaments below the primary battery, and their protection, is still in process of change. In the British battleships, for example, when the Dreadnought principle was introduced, the intermediate battery of 9·2-in. guns fitted in the King Edwards

and the Lord Nelsons was omitted, and in place of two or more descriptions of guns in the torpedo defence battery only one was used. At the same time the armoured protection to all but the heaviest guns was abandoned. In some foreign ships of the Dreadnought era, notably the German, the thin side armour for the protection of the intermediate battery was retained over the lighter guns, but both armour and guns showed a decrease in weight. While the Deutschlands carried fourteen 6·7-in. guns behind armour of the same thickness as their calibre, the Nassaus have twelve 5·9-in. guns, and exhibit a corresponding decrease in the thickness of armour. The British practice introduced in 1906 has been followed in all the Dreadnought type of battleship hitherto, and although the torpedo defence guns have shown an increase in calibre they have not been protected by armour. In the King George class, it was reported that with the increase of the calibre of the torpedo defence guns to 6 in. there would also be a return to armoured protection for these guns. It seems more likely, however, that this change will occur in the Iron Duke class. Obviously the question of the so-called secondary armament remains a debateable point, but while most navies are adopting a 5-in. or 6-in. gun not all of them are mounting a third gun for dealing with torpedo attack. Moreover, there has not been in any country a return to the batteries of 9·2 in., 8 in., 7·5 in., or 6·7 in., which supplemented the smaller number of 12-in. guns in the primary batteries of pre-Dreadnought ships.

Intermediate and secondary batteries.

The practice in regard to the anti-torpedo battery in foreign navies differs in detail, but is fairly similar in character. The Germans, in the Kaiser class of battleships, retain the 5·9-in. and 3·4-in. guns, which they have in the Nassau class, but in place of twelve of the former have now mounted fourteen, and for sixteen of the latter are mounting only twelve. This plan of mounting two descriptions of guns in the anti-torpedo battery appears to be followed only by Austria-Hungary and Brazil. The former Power, in the Viribus Unitis class, has twelve 5·9-in. guns and eighteen 12-pounders, while in the latest Brazilian ship, the Rio de Janeiro, there are twenty 6-in. and ten 3-in. guns. In both cases the heavier gun is to be behind armour. The Americans, in the Nevada and Oklahoma, are to mount twenty-one 5-in. guns behind armour, and the French are also in the Bretagne class to mount twenty-two 5·5-in. guns in this battery. The Italians have advanced from the 4·7-in. mounted in their first four Dreadnoughts to 6-in. guns in the two ships of the Andrea Doria type. The Russians, in the four ships of the Sevastopol class, will mount sixteen 4·7 in., and Chile, in the Valparaiso, is also content with this calibre of gun, but will mount

Two-calibre anti-torpedo batteries.

twenty-two. The thickness of armour to these guns is more or less dependable upon the displacement of the ship, but, apparently, in the opinion of most naval constructors it should not be less than 6-in. The necessity for disposing the guns of the anti-torpedo battery in such a manner as not to interfere with the arcs of training of the heavier guns has conduced to diversity in practice, but there appears a general tendency to bring the greater number of these guns into a central casemate, and although it has been suggested that the guns might be so fitted as to be placed below during a day action, there are no indications that this method is likely to be adopted at present.

Armour. So far as heavy armour is concerned, while improvements and modifications in methods of manufacture are widely reported, these do not appear to have affected the character of recent plating to any large extent. The standard of resistance has been raised in plates of British construction, as was stated in last year's *Naval Annual*, and possibly in some of those made abroad, but in no case sufficiently to bring about any such a revolution as was caused by the introduction of the Harvey and Krupp processes. If this were not the case, it is hardly likely that so many Powers would be experimenting with thicker plates than those which have been used in the latest ships. Nor have any of the novelties, from which so much was expected a short time back, justified as yet the promise of the earlier announcements concerning them. It is rather from improvement in metallurgical processes, and by the introduction of new alloys and methods of face-hardening, than from any novel systems, that fresh developments in the competition between attack and defence are anticipated. Meantime, there is clearly an inclination to distribute armour more widely, and the decrease in area of side plating, which was a feature in the first Dreadnought, has become less marked. In the later battleships an extension of vertical side armour, both upwards and downwards from the water-line, is manifest. This may be owing in part to the necessity for keeping out high explosive shell, but also partly because, as Sir Reginald Custance said in the lecture he delivered before the spring meeting of the Naval Architects' Institution, "the losses sustained by the Variag at Chemulpo and by the Russian ships at Ulsan seem to show that armour protection against fragments of bursting shell is absolutely necessary."

It is now universally recognised that the gun has proved its superiority to the armour, and though, as has been said, the resisting power of the latter has made some advance, no adequate measure of meeting this superiority seems possible except by increasing the thickness of the plate. If this is done, there must be a greater

sacrifice of some other element, and probably one that is more essential to fighting efficiency. While the main belts are getting deeper, they are not longer in proportion to the length of the vessel, and at the same time, as they are carried higher for the protection of the anti-torpedo battery, this form of providing for the safety of the crews of the lighter guns may be substituted for the turrets or barbettes in which these guns have sometimes been placed. There was apparent at one time a leaning towards an increase in thickness of the armoured deck, and to give it a curvature at the sides, extending much lower down than heretofore; indeed, it was proposed to carry the edges of this deck down below the bottom of the armoured belt. More recently, however, the desire for internal armour has weakened, and this method of protection, copied from French designs, has not been followed to the same extent in later British ships. The proposal to armour the upper deck, caused by the apprehension of bombs to be dropped from aeroplanes, has not yet materialised in any of the leading navies, but in addition to the armoured bulkheads which afford protection against raking fire, splinter-proof traverses are already adopted in some of the most recent designs. So far as protection against under-water attack is concerned, the methods adopted have for their purpose the localisation of the effect of explosion from mine or torpedo.

Recent American practice.

A new development in armoured protection is indicated by the accounts received of the design adopted for the new battleships Oklahoma and Nevada, the keels of which have recently been laid down. In this matter the Americans would appear to have been influenced by the result of the experiments made with the San Marcos. It is stated that the belt armour in these vessels will have a maximum thickness of 13·5 inches. This is heavier than anything that has been put upon modern ships, at any rate during the last decade, and shows a great advance upon the 11-in. belts of their immediate American predecessors. This belt is to be 17½ ft. in width, and to extend over 400 ft. of the 575 ft. which is to be the length of the vessels at the water-line. It will thus reach before the forward barbette, and come about 30 ft. abaft the after barbette. The height of the belt is to be 9 ft. above the water-line and 8½ ft. below it, the thickness at this point falling to 8 in. Into either end of the belt will be worked a 13-in. athwartships bulkhead, while the extreme ends of the vessel are to be protected by a curved steel deck of 1·5-in. in thickness. The faces of the triple gun turrets are to be protected by sloping plates of 18-in. steel, and of the twin gun turrets by 16-in. steel. The latter thickness of armour will also be used for the conning-tower, signal station and communication

tubes, while the base of the single funnel will have a glacis of 13-in. armour. If the above description should prove to be correct, it is obvious that to some extent these vessels show a return to the soft-ended type which has been the subject of so much criticism.

Reference has already been made to the necessity for some provision in the matter of defence against the splinters caused by bursting shell. In the Kaiser class, the Germans, in addition to placing their armament of 5·9-in. guns behind 7-in. armour, have provided splinter-proof lateral screens as a protection to the crews against flying *débris*. For this purpose and for deck plating those descriptions of armour which are not perhaps primarily intended for the thickest plating may be used with advantage. On the opposite page an "Era" cast-steel shield is shown, and Messrs. Hadfield are supplying large quantities of the material of which these shields are made for ammunition tubes, conning-towers, etc., to various Governments. An illustration on the same page represents some of the "Era" steel communication tubes which have been made for a foreign Power.

"Era" steel shields.

The results of some recent gunnery experiments, so far as they can be ascertained independently of official sources, and the conclusions to be derived therefrom, have been instructively summarised in an American professional journal. They are, in effect, as follows:—

It is indicated that existing armour is not sufficiently heavy to prevent a battleship from being sunk by gun fire.

That masts, funnels, light upper works, and unprotected or partially protected guns cannot survive the first clash of battle.

That as little wood as possible, or none at all, should be used in ship fittings and accessories.

That linoleums and heavy coatings of paint must be avoided, as certain to give rise to local and stubborn fires whenever compartments in which they are used are reached by explosive shell.

That main armour belts must be much wider and carried well under water as well as above, and continued to the extremities of the ship.

That an armoured upper deck is a necessity.

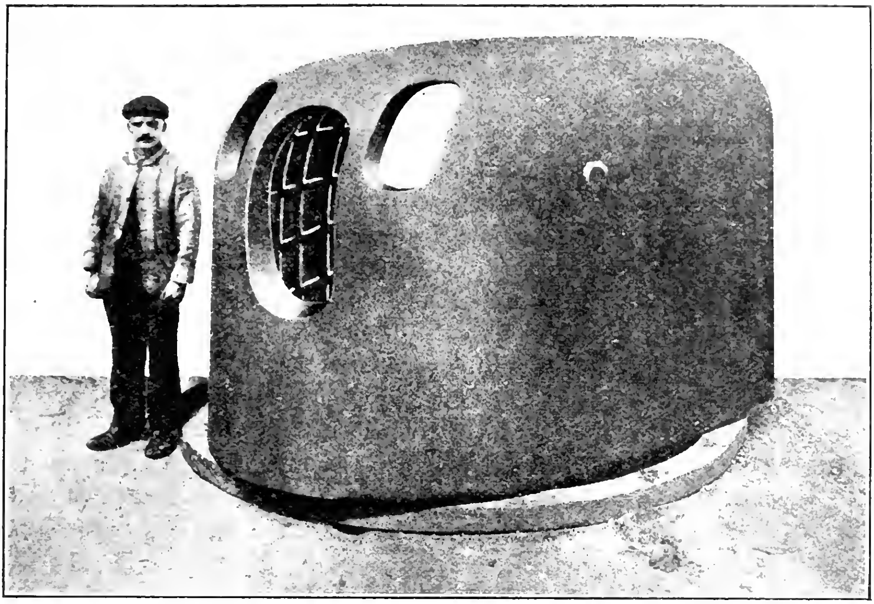
That light belt, casemate, and bulkhead armour is only just a good igniter for shells on impact or at penetration.

That armour should not be worked except where it is absolutely essential for protection.

That to prevent the dislodgment of armour as now carried and fastened, the plates should be of the largest dimensions compatible with their adaptability for handling and transportation.

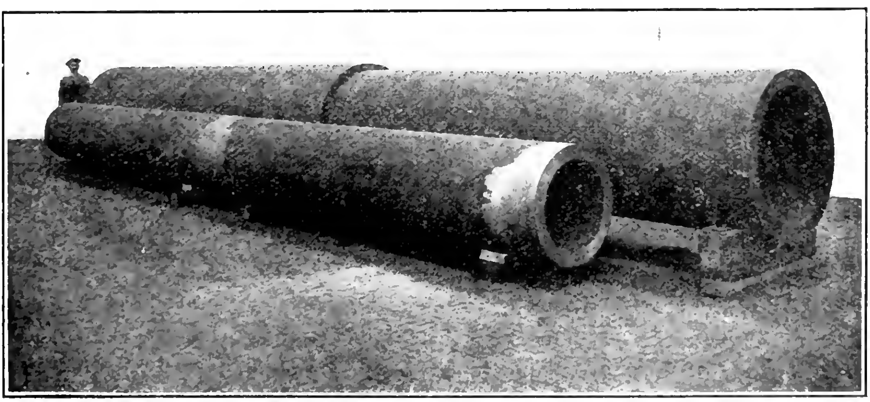
That a greater proportion of the total displacement must be assigned to armour if it is actually meant to provide against damage to buoyancy and stability, to assure the integrity of the armament and vital parts, and to effectively protect the complements of the ships.

With many of these conclusions there will be general agreement, but the last-named—the assignment of still larger weights to armour—is not likely to meet with endorsement from a large section of the naval students and observers in all countries. On the contrary, if



Protective "Era" Steel Shield (Hadfield's Patent) for the Mounting of 6-in. Quick-firing Guns.

This patented type of the Hadfield Shield for all calibre guns is being supplied in large numbers to several Governments for warship purposes and land defences.



"Era" Steel Communication Tubes for First-class Cruiser.

the question is not raised, Should there be a total abandonment of armour? it is certainly asked whether the time has not come when a large reduction might be made with general advantage and without loss of battle efficiency? It is manifest that the apportionment of weight to armour in recent ships has already increased out of all proportion to the effectiveness of the protection ensured. At no reasonably probable range for beginning an engagement does the armour now used offer adequate or substantial protection against the heaviest gun. The suggestion is made, therefore, to reduce the armour and to utilise the weight saved to increase the gun power, which is the most effective form of defence. So far as may be judged from the discussions which have taken place about this matter, the reasons assigned for not following this course are these: Armour protection gives a moral support to the men, or, in other words, the men who had not its protection would not fight with the same heart as those who were given it. Secondly, that peace trials, and, to some extent, reports from the actual test of war, were delusive, and not to be relied upon. It is possible that the powers of the gun have been unduly magnified in peace experiments, in which case it may be hoped that better results will be obtained from the armour in an actual battle. And, finally, while it is now necessary to make high explosive shell armour-piercing, and therefore with thicker walls and a smaller bursting charge, if the armour is removed or its thickness reduced, shells will be made thinner, and given bursting charges which will have destructive effects far exceeding even those famous Japanese "portmanteaux" which caused so much damage at the Battle of Tsushima.

Gun-mountings.

Improvements in heavy and light gun mountings are constantly being evolved. Progress in this matter is very rapid, and it is only those who are in constant touch with the designers and manufacturers of these appliances who can hope to keep abreast of the many changes. It is a common experience with naval officers who have been abroad, for, say, two or three years, to find themselves on their return in the position of students who have to spend some months of concentrated energy to become fully acquainted with the alterations which have taken place in the meantime.

Messrs. Armstrong of Elswick have during the past year, amongst many other matters, taken out patents for improvements of gun-mountings. Amongst these we find a chain rammer for loading ordnance, which is capable of being worked at high speeds without vibration or noise. This improved rammer also enables the loading mechanism of the gun to be very much simplified. Another invention of this firm is connected with the elevating gear of gun-

mountings. The object of this invention is to enable a pair of guns in a turret to be directed and fired sometimes separately and sometimes simultaneously, only one sight being used for the direction of both guns in the latter case. The two guns can be connected either for independent fire or simultaneous use at will. When connected for the latter purpose, arrangements are made that they move perfectly together when elevated, and also that corrections can be made, so as to allow for any difference or discrepancy in the firing of one gun as compared with the other, the result being that when the guns are fired there will be no difference in arranging.

The outstanding features of a new Beardmore 6-in. gun-mounting are the arrangement of the sights and of the traversing gear. The aim of the designer has been, as regards the sights: (*a*) to reduce to a minimum the movement of the eye-pieces of the telescopes when elevating the gun or setting the sights for range; (*b*) to ensure the movement of the two telescopes being always absolutely identical; (*c*) to reduce the possibility of backlash in the gearing of the range and deflection dials. And as regards the traversing gear: (*a*) to avoid the evil effect of backlash; (*b*) to provide a frictional connection only between the traversing hand-wheel and the gun, crosshead and shield; (*c*) to do away with the necessity for an oil bath; (*d*) to facilitate manufacture and fitting.

Beardmore 6-in. mounting

The telescopes are carried on a rocking bar, the hinge of which is close to the trunnions of the cradle, and on it the telescopes are so placed that their eye-pieces are also close to the trunnions, hence any movements of the cradle (and gun) about its trunnions, or of the rocking bar about its hinge, are scarcely appreciable to the men looking through the telescopes.

The whole sighting arrangement, including sight cam, range and deflection dials and electric motors for operating the pointers, is carried on a metal bracket secured on top of the cradle above the trunnions; this can be readily removed from or placed on the cradle; the complete sight forms a separate unit, and does not necessitate the disturbance of any other part.

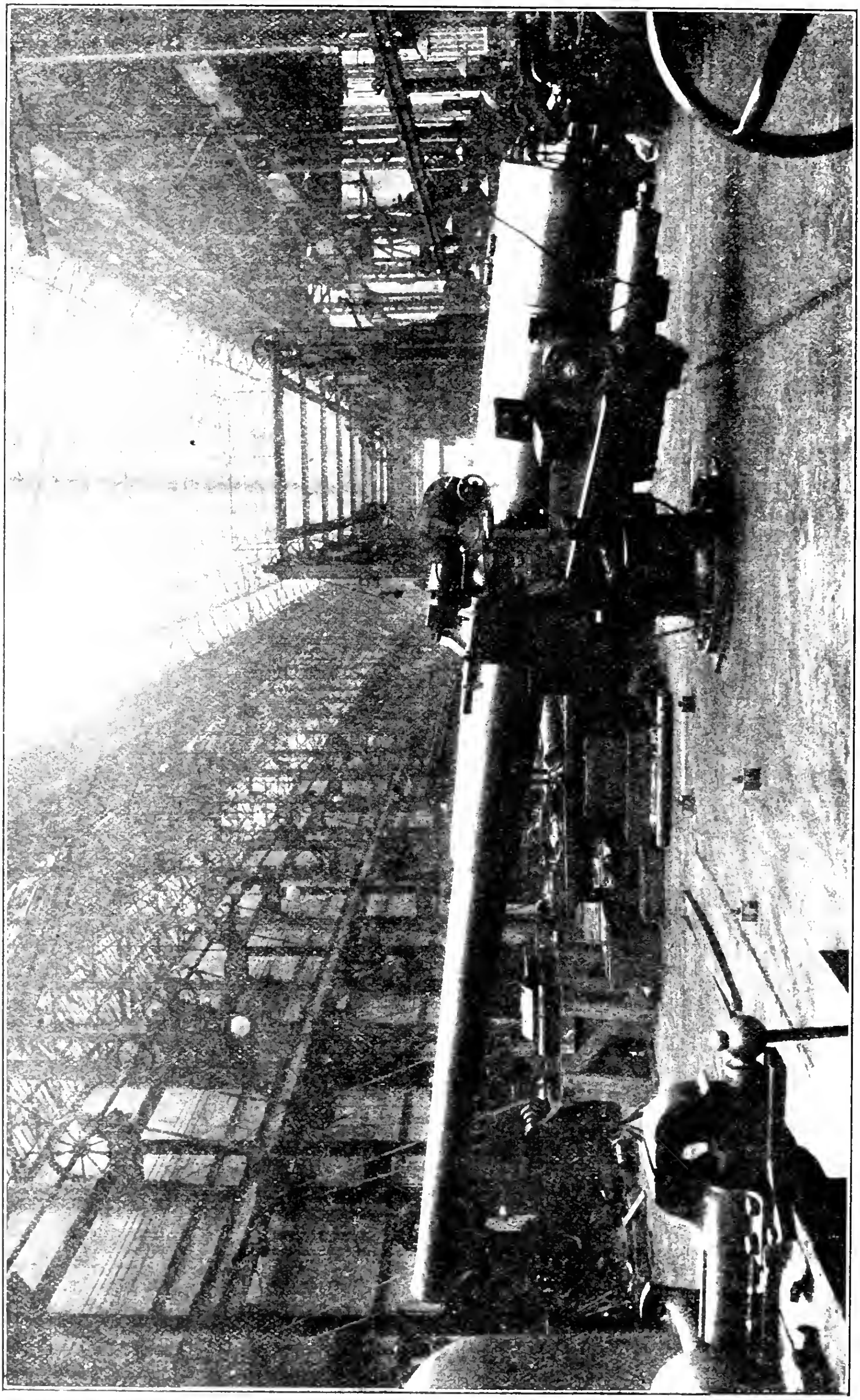
The rocking bar hinged to front part of bracket consists of a semicircular U-shaped trough, in which slides a correspondingly curved steel bar, the front ends of which are connected together by a straight steel bar stretching across from one side of the cradle to the other. This bar carries at its extreme ends the telescopes, one on either side of the mounting; thus the connection being rigid, the movement of the two telescopes must always be identical. Part of a worm-wheel is secured to the above-mentioned curved part of the rocking bar, and a worm on the shaft of the deflection dial provides necessary movement for deflection.

For the movement in the vertical plane necessary for adjusting the sight for range, the rocking bar is driven about its hinge by a cam, which is in one with the range dial, situated towards the rear part of the bracket; the cam and dial are driven as one by a shaft through the medium of a worm and worm-wheel.

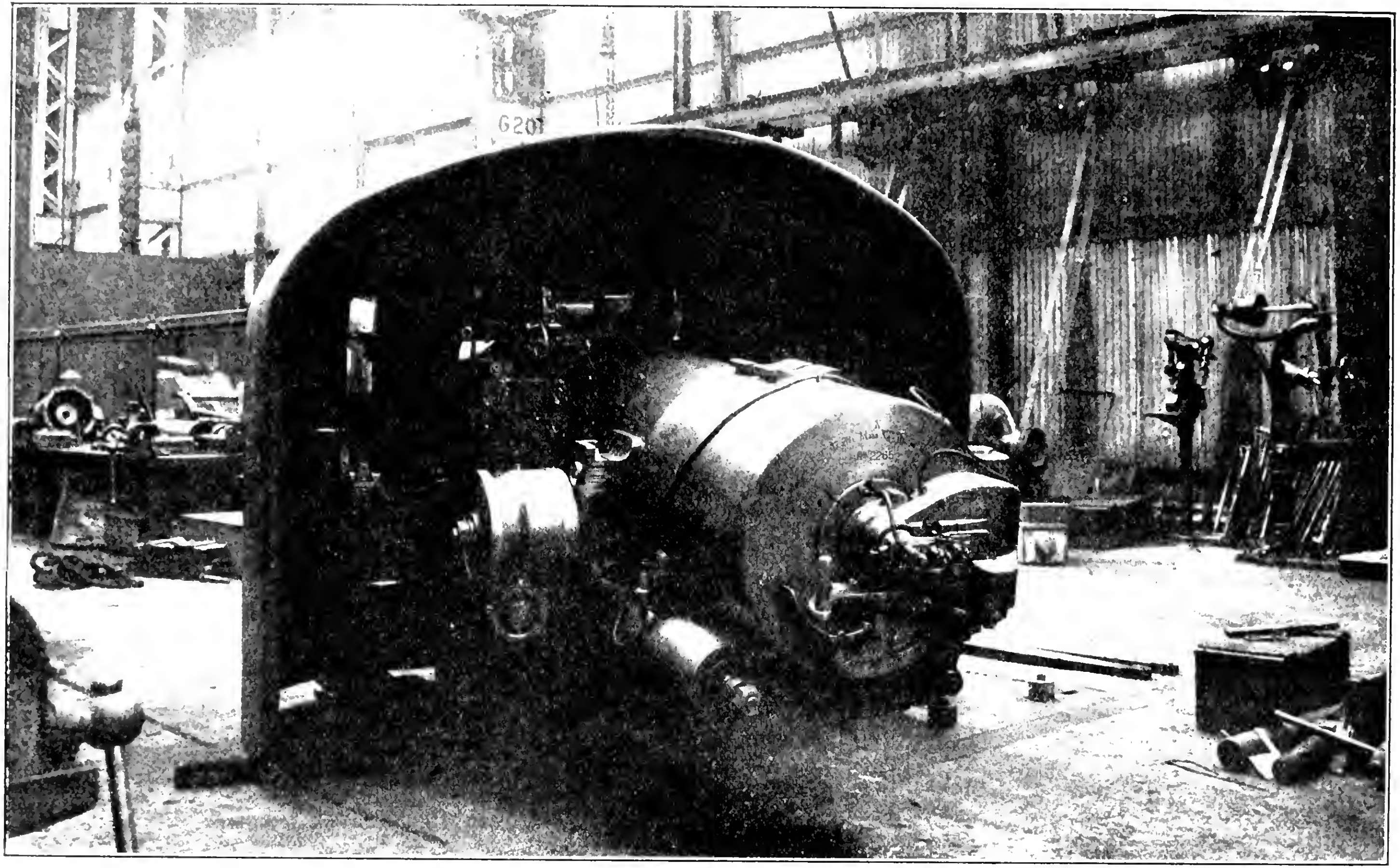
Though in the case of both range and deflection gears the arrangements are such as to render the necessity of it improbable, simple means of taking up any backlash are provided in both.

To compensate for deficiency in manufacture, accidental distortion, or when changing the sight from one cradle to another, means are provided in the telescope carriers for adjusting the parallelism of the telescopes in both planes.

The elevation and deflection are given to the sight by suitably geared and placed hand-wheels worked by the sight-setter, for whom a seat is provided behind the gunlayer. The seats for the gunlayer and traverser have got height adjustment to compensate for the difference in the heights of men. Foot-rests are also provided



Messrs. Beardmore's 6-in. Gun Mounting (Side View).



Messrs. Beardmore's 6-in. Gun Mounting (Back View).

for all three, with simple means for lifting, lowering, and securing same without using screws or clamps.

The traversing gear is novel in that the worm-wheel usually attached to the fixed pedestal is replaced by what may be termed a nest of friction rings, and the worm usually gearing with it is replaced by a corresponding nest of friction discs. The traversing ring is secured to the pedestal and has a circular flange standing away from it about 4½ inches. This flange has got V-shaped horizontal grooves running round its outer surface, and a smooth inside surface. To the carriage revolving in the pedestal is hinged vertically a bracket by means of a somewhat modified bayonet lock, and in this bracket is enclosed the whole of the rest of the gear.

A vertical shaft, supported in the bracket by roller bearings, is provided at its lower end with a friction pinion (the discs) corresponding in section to that of the outside of the flange, and at the upper end with a worm-wheel to engage the traversing worm. The worm-wheel is kept small (the number of teeth in this case is nineteen only), which ensures an equal wear all round the wheel, since even a small arc of traversing entails complete revolution of the wheel.

The traversing worm is secured to a horizontal shaft, which also carries suitable gear connecting it to the hand-wheel, and has besides got means for taking up any backlash which might occur in course of time between traversing worm and worm-wheel. To give the necessary pressure between the traversing friction pinion (the discs) and the circular flange, and thus provide sufficient friction for traversing and suitable muzzle resistance, a roller is placed inside the flange which, by means of a spring and a bell crank lever, is pressed against the smooth inside surface of the flange. As the bell crank is hinged to the bracket, the roller keeps the friction pinion (the discs) up to its work, and also secures the bracket in its place. This traversing system has been used for a 4-in. mounting as well as for a 6-in., and has by now been given a good trial. It runs very smoothly, is not affected by wear, in fact it improves with it, and is not sensitive to any eccentricity of the working surfaces in the flange. No pressure from the spring can be communicated to the carriage pivot, so that no friction is set up between pivot and pedestal.

It will be seen from this that a blow from the enemy's prejectile on gun or shield will simply cause the friction connection with the carriage to slip, and thus probably avoid disruption of the gearing.

The necessity for an oil bath is, obviously, avoided, together with its elaborate oil-tight packings, &c.

The difficulty of the manufacture of the large worm-wheel and of obtaining accurate fittings with its worm is removed; the elasticity of the spring which produces the friction connection automatically takes up any irregularity that might possibly exist in rings or discs.

The carriage pivot is provided with a vertical roller-bearing, and double speed is provided in both elevating and traversing gears. The change from one speed to another is done by turning over a small lever, and is both positive and instantaneous, as the engagement takes place in any position.

The cradle and recoil cylinder are cut out of one forging by the procedure of boring, turning and slotting used by the firm for 6-in. as well as for 4-in. mountings.

The shield provided for this mounting is of the usual type, but it will be noticed that the gunlayers, sight-setter and all the delicate parts of the sighting gear lie snugly within its shelter, unexposed to splinters, &c., caused by the enemy's fire.

Fire-control positions.

Regarding the fire-control positions fitted in the British ships, the vessels of the St. Vincent and Indefatigable classes had their mast forward of the funnel, the arrangement of the guns in these ships no doubt allowing for this, but in all vessels following these, with the exception of the cruisers of the 1911–12 programme, the mast with the fire-control position is abaft the funnel; in the latter vessels the fire-control positions have been arranged on the forward and after towers. The Admiralty have decided to modify the positions of the fire-control in some of the later vessels.

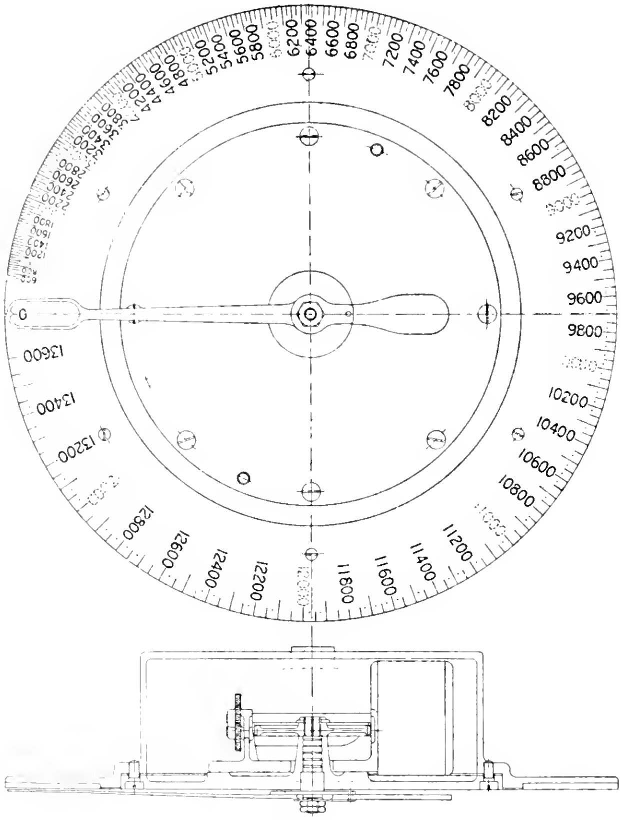
If it is desired to continue placing the control position aloft, it seems clear that this should be placed forward in the ship, before the funnels, so as to lessen the inconvenience to the observers arising

from the heated gases or smoke, either of which are likely to impede the view. It should be as high up as possible also so that the accuracy of the observer's view should not be influenced by the smoke or vapour from his own guns. If, as in the latest American ships, there is to be only one funnel, this should facilitate the problem, the importance of which is manifest, since the situation of the control position is a vital principle of men-of-war design. It seems likely, however, that before long the control stations will be brought down to conning-tower level.

Accuracy of fire is very largely the result of the adoption of the Vickers well-known "Follow the Pointer" system, and this is being applied to all mountings, irrespective of the bore of the gun or of the number of guns in the turret, whether one, two or three. The principle, which is now very widely accepted, consists briefly in the fitting of a large dial to the sight, with an electrically controlled pointer, as is shown on the following page, where the arrangement of the transmitter switch is also shown. The dial is graduated, and there is an index point on the stationary part of the sight. When the range is transmitted from the control station the pointer is moved round from the zero towards the range at which the sight is required to be set. The sight-setter then operates his control wheel so as to keep this pointer always opposite the index mark. This consists in elevating the sight until the range on the dial, to which the pointer has been deflected, is brought opposite the zero mark. The same principle is applied to the deflection gear. Gun sighting.

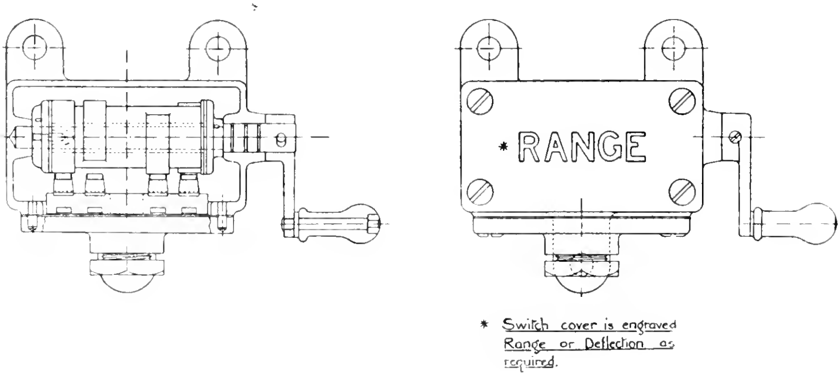
This system, after many improvements, has been cut down to a very simple form of transmitting switch, consisting of a plain drum with four contact pieces, one of which makes continuous contact, and the others alternately engage with cams. The receiving portion consists of a simple step-by-step motor mounted on a base plate, gearing with a worm and wormwheel of the spindle of the pointer. The deflection receiving portion is exactly the same as that for the range, except that the gearing is arranged to suit the smaller number of divisions.

The receiver for these instruments is so constructed as to form a separate unit, which is attached, in conjunction with the sighting gear, in such a manner that the sight may be used with or without this gear, and its removal or emplacement does not make any difference to the sighting gear or require any alteration to enable the latter to be used in the ordinary way. To the ordinary transmitter there is fitted the repeat receiver, which acts as an indicator to the transmitting number. This repeat receiver registers the transmissions, and thus in itself forms a separate unit, and is exactly



FIRE CONTROL SYSTEM.

Vickers' "Follow the Pointer" Range and Deflection Instruments.
Arrangement of Range Repeat Receiver.



FIRE CONTROL SYSTEM.

Vickers' "Follow the Pointer" Range and Deflection Instruments.
Arrangement of Transmitter Switch.

in conjunction with the receiver attached to the sight, as already explained.

Projectiles.

The hollow caps referred to in the *Naval Annual* last year and the year before, which were introduced by two Sheffield firms, Thos. Firth & Sons and Hadfield's Steel Foundry Co., Ltd., the well-known projectile makers, have completely proved their merit. Solid caps are practically obsolete, and all the leading navies of the world have adopted hollow caps; and the few which have not already definitely accepted this type of cap for their armament are experimenting to satisfy themselves of its value. It is gratifying to Englishmen that a new departure of considerable moment should have been evolved in this country, as so many recent inventions with regard to implements of warfare have first seen the light in other countries, the earliest caps being used in the Russian and United States Navies.

In this connection illustrations are given on pages 292–3. These show various fragments of various caps assembled after having been fired at a mild steel plate; all these caps are of the same design, as shown fitted to the unfired projectile on the left of the illustration. The caps marked "B" and "D" have, it will be noticed, behaved excellently, preserving their ring form until a late stage of the perforation. The caps marked "A" and "C," which were not quite so good, have still made a fairly perfect ring. The object of the firing at a mild steel plate was to make certain of catching the fragments of cap so that they could be examined and reassembled. When fired against hard-faced plate, the caps are more disrupted and the pieces are more difficult to obtain. It will be noticed that each of the four caps tested expanded about a calibre diameter before bursting. Similar, and indeed even more severe action, occurs in regard to capped shot fired at hard-faced plates.

Mark.	Fired at.	Striking Velocity.	Inside Diameter of Bottom Rim.	
			Before Firing.	After Firing.
		f.s.	in.	in.
A	5-in. Mild Steel Plate	1,060	2·8	3·65
B	Ditto	1,060	2·8	4·08
C	Ditto	1,082	2·8	3·73
D	Ditto	1,035	2·8	4·12

Messrs. Thomas Firth and Sons, after having for many years confined themselves to supplying projectiles without explosives, recently decided that it was desirable, in view of the great extension of their business abroad, to put themselves in a position, in combination with manufacturers of influence, to supply complete ammunition for ordnance. This they have now done, and are in a position to provide

This Projectile, taken from current supplies, represents one of the Hadfield "Heclon" Armour-Piercing Projectiles 12-in calibre, weighing 860 lb., equipped with their new Patent Cap, which was recently fired against a 12-in. K.C. (Krupp Cemented) Plate at under 1700 f.s., equivalent to a range of about 6¼ miles.

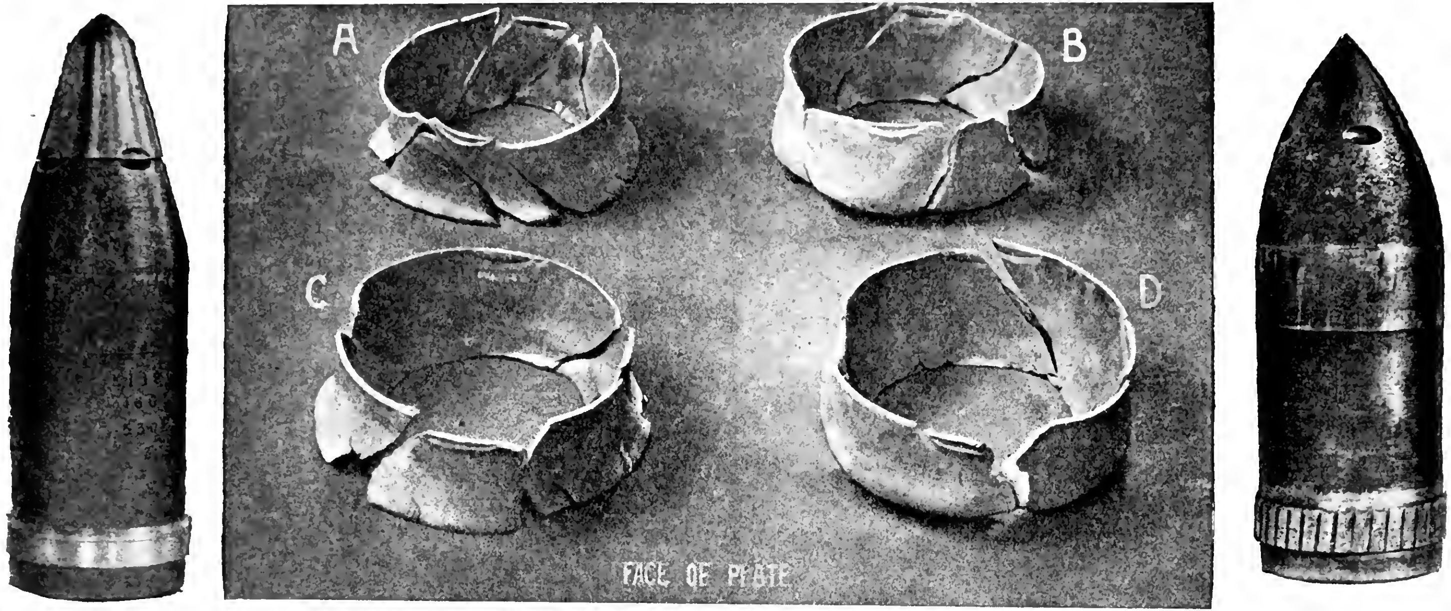
The Projectile perforated the 12-in. Plate, the Skin Plate, Backing and Target, and was recovered unbroken at a distance of over 2 miles beyond the target.

This]Projectile represents a Hadfield 14-in. "Eron" Shell of large bursting capacity, after perforating, unbroken, a 6-in. K.C. (Krupp Cemented) Plate of the latest type. The Projectile was fired at the low velocity of 1120 f.s., passed through the K.C. Plate, Backing, 24 feet of sand-butt, and was recovered unbroken about a quarter of a mile beyond the butt.

This Projectile represents a Hadfield 14-in. "Heclon" Armour-Piercing Shot (Capped) after perforating, unbroken, a 12-in. K.C. (Krupp Cemented) Plate of the latest type. This projectile was fired at a velocity of 1497 f.s., passed through the 12-in. K.C. Plate and no less than 20 feet of sand butt.

No other 12-in. K.C. Plate has yet been perforated at this extraordinary low velocity, which is equivalent to a range of no less than 7¼ miles—that is, a 12-in. K.C. Plate would have been perforated by this Hadfield Projectile from a gun placed 7¼ miles away.

HADFIELD'S LARGE-CALIBRE A.P. CAPPED PROJECTILES.



Fragments of Caps Re-assembled after Firing.

ammunition from the smallest type of 1 pdr. to the 15-in. armour-piercer, the projectiles being filled with either Lyddite or T.N.T., and fitted with fuses of the firm's own design. Their arrangements enable them also, though not manufacturers of cordite, to supply completed cartridges both for breech-loading guns using silk cloth-covered cartridges and for quick-firing guns having their charges contained in brass cases. The necessary tubes, primers, brass cases for packing the cartridges, and all the other details, are also now supplied by them. The firm is therefore in a position to supply complete ammunition for a battleship.

Ammunition hoists.

In last year's edition an improved ammunition hoist for dealing with the ammunition of the lighter armaments was described. This hoist was power-worked and intended for comparatively long lifts. Messrs. Armstrong have now designed and patented a hoist which can readily be worked by one man without excessive effort. The arrangement is very simple and ingenious, and almost, except the effort of the man in pulling on a rope, automatic in its action, as it receives the ammunition below and deposits it without further attention on to the loading tray at the gun position.

Although a man can lift a 100-lb. projectile breast high, he would have much difficulty in raising it above his head in order to pass it through the gun-house floor to a man above. Also there would be considerable danger of the projectile being dropped. The possibility of men being able to pass the projectiles up at the rate required is doubtful. From experiments which have been made, it has been proved that if the projectile is hoisted in a light cage balanced as to the weight of the cage and half the weight of the projectile, it is a very easy matter for a man pulling at a sufficiently large and soft rope (such as is used in tolling a bell) to raise the projectile in about three seconds. The new Elswick hoist is made to deliver the projectile into a swinging loading tray, by which with one other motion it can be swung round into the gun. The loading tray is swung round into the position to receive the projectile, is made with a hinge, and is cut away to allow the two Z-shaped arms of the cage to pass through it. Thus the projectile in rising passes above the loading tray by tipping it like a flap, which then falls down under the projectile, the arms of the cage on its return passing through the loading tray, and leaving the projectile supported on the loading tray. As the guides of the cage are curved to a radius struck from the trunnion centre, the above action can take place at any angle at which the gun is required to be loaded.

No one is required to attend the hoist above the floor level, and the man loading has only to swing the loading tray round to the gun

and to return it for the next projectile. One man below hauls up the cage and projectile, and then hauls (by the other side of the rope) the cage down and the balance weight up. Another man below keeps the waiting tray charged, and the cage on coming down automatically receives a new projectile. An indicator would show the man hauling up the projectile when the gun-loading tray was in place ready to receive another projectile.

The operation of the hoist is as follows:—

When the man pulls at the bell rope he hauls up the 100 lb. shot and 20 lb. weight of cage; the balance-weight, which is 70 lb., helps him, so that in effect he lifts only 50 lb., which with a soft rope he can do hand over hand easily. He pulls down, say, 8 ft. of rope and the projectile is brought above the loading tray. He then lets go the rope and the projectile settles into the loading tray, but is pressing on it with only 50 lb., the balance-weight still holding against the rest of the weight of the projectile and cage. This is a position of rest, in which it is safe to let go of the rope for any length of time. By taking hold of the other rope and hauling down the empty cage, 20 lb. of cage is assisting to lift the 70 lb. balance-weight, so that the effort on the rope is again 50 lb. only. When the cage is fully hauled down it has struck a catch which sets free the projectile ready in the waiting-tray. This projectile falling into the cage holds it in place, and again the rope can be left for any length of time. Should there not be a projectile in the waiting-tray, the cage is held by an independent catch, which only gets relieved of its duty when a projectile is placed or rolls into the cage. The cordite, which is within the weight a man can easily handle, is passed through a hatch in the floor on the opposite side of the gun.

The diagram on the following page illustrates an ammunition hoist patented by Messrs. Armstrong, of the differential type such as is used, for example, where the powder charges are stowed on a deck above the shell-room, so that the cage used for raising the powder charges has a smaller distance to travel than the cage carrying the shell.

The object of the invention is to provide a differential hoist of improved construction, more especially as regards simplicity of mechanism and certainty of operation. One of the cages is connected to the other by a rope reeved over sheaves mounted on either cage, one end of the rope being fixed to one or other of the cages, while the other end is fixed in a suitable position so that when the upper cage moves the lower cage moves faster. The number of sheaves is such as to give the required increase of travel to the lower cage. Should, however, the difference in travel of the cages be such

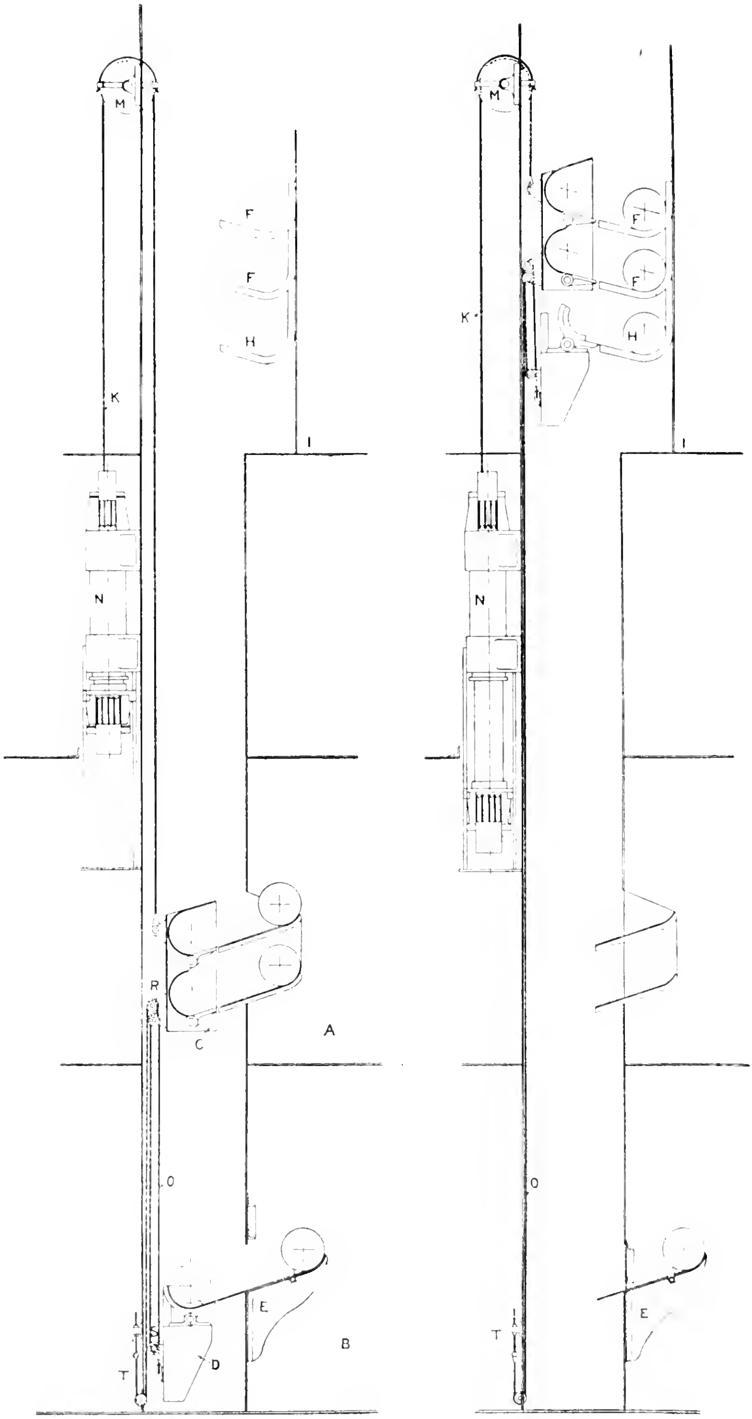


Fig 1.

Fig 1 a.

Armstrong Ammunition Hoists for Heavy Gun Mountings.

that it cannot be obtained by a mere multiplication of the sheaves, the number of sheaves are employed that would give a difference of movement larger than is required, and the end of the rope is attached to a slide which is moved downwards by the lower cage in the last part of its downward travel.

Landing guns.

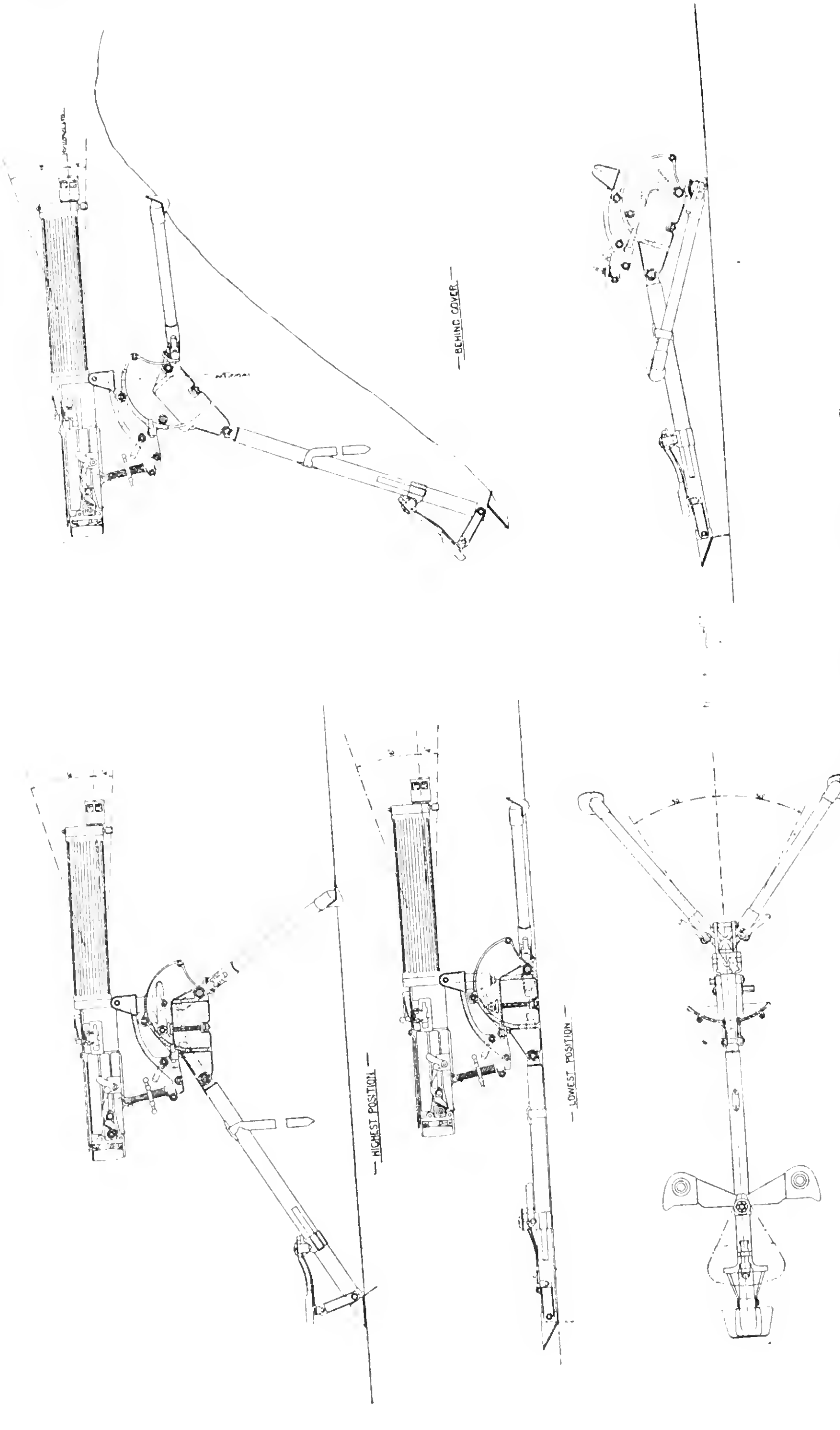
The seamen of the Navy are often called upon to conduct expeditions in the various parts of the Empire, and the naval landing gun is probably the most frequently used in actual warfare of all naval weapons. These guns are usually of the 12-pdr. type, but the machine gun offers considerable advantages, especially in hilly country, and it is therefore interesting to record, not only the improvements made by Messrs. Vickers, in their well-known Adjustable Tripod Mounts for their Automatic R.C. Gun, but in the limber which they are manufacturing in connection with these tripod mountings for the use of naval landing parties.

The tripod mount is of advantage, not only because it can be so easily carried itself over difficult country, but because it is mounted in such a way as to enable the gunner to take advantage of any cover which the natural contour of the country affords him. The illustrations on page 298 show the gun and tripod mount in various positions. There is first an elevation showing the gun in its highest position, viz., with the line of sight 32 in. from the ground level. The second shows it in its lowest position with the line of sight 16 in from the ground level. There is also a view showing the gun behind a bank, against which the two front legs are resting, while the trail shoe of the rear leg has its deep flange so placed as to prevent slipping. In all positions the gun can be trained about a vertical pivot without altering the angle of elevation in which the gun is laid, while the slope of the ground on which the gun may thus be adapted ranges from 50 degrees descending to 60 degrees ascending. These figures show the great adaptability of the tripod mount. The last view shows the mounting in its housed position. In this case the front legs are folded back for facility in transit.

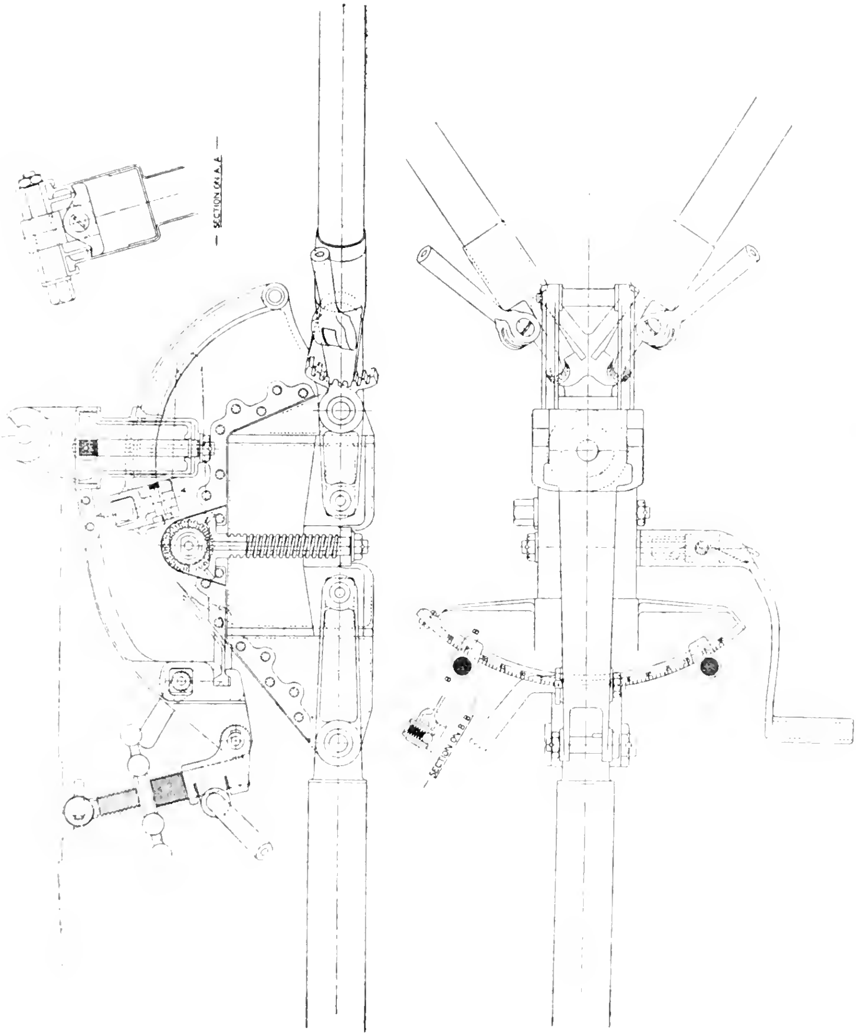
The important feature is, of course, the method of mounting the gun and securing the legs, and altering their angle, relative to each other, to the quadrant-shaped structure, illustrated in detail on page 299.

The gun itself is carried on a crosshead with a pivot which fits into a socket to enable it to be trained. This pivot has a frame extending rearwards, on which is carried the elevating screw of the usual right- and left-handed screw type, and on the same frame there is a clamp to secure the gun at the desired elevation. The socket for the pivot and the training arc are mounted on guides on the top of the casing carrying the screw for the adjustment of the legs and of the position of the gun relative to the ground level or slope.

There are two movable training stops, each having a spring plunger engaging in teeth formed under the training arc. As shown in the section BB, on page 299,



Adjustable Tripod Mark F Vickers' Automatic R.C. Gun.



Adjustable Tripod Mark F Vickers' Automatic R.C. Gun.

when the plunger is pushed down, the teeth are disengaged, and the stop may be moved along the training arc. The clamp for the top carriage consists of an eccentric bolt and link with a hinged plate. The adjusting gear handle serves for this clamp, and fits on a hexagon on the eccentric bolt. When the handle is pushed down, the eccentric bolt on the socket raises the hinged plate against the guides on the adjusting gear casing, and thereby the top carriage is secured in any position. The handle operates the adjusting screw through bevel gearing, and by this means raises and lowers the adjusting nut, as seen on the large elevation on page 299. The upper ends of the front and rear legs are engaged by this adjusting nut, and through it receive parallel motion, which alters their angle relative to the ground level. This adjusting gear is enclosed in a casing having at the top of the side-plates guides for the top carriage, and as these guides are fitted outside as well as inside they hold the side-plates rigid. The side-plates are also provided with bearings for the fulcrums of the front and rear legs, and with slots which form guides for the adjusting nut.

The front legs are attached to a Y-piece pivoted in the front bearing, which receives its movement when the adjusting nut is raised or lowered, and on each side of this Y-piece there is a bolt with an eccentric clamp for attaching the front leg. Above, and radial from the bolt, is a toothed segment for engaging the teeth formed at the top of the front leg. By this means the mounting can be adapted for any uneven ground. At the upper end the legs are secured by means of a link having a longitudinal slot, so that the legs can be disconnected from the teeth of the Y-piece and folded back as in the housed position.

The rear leg of the trail is pivoted in the rear bearing. Its angle relative to the ground is altered by the raising or lowering of the adjusting nut.

A word may be said regarding the seat for the gunner. It is carried on a hinged bracket and a sliding sleeve, so that it can be pushed down flat on the trail to form a kneeling pad when the gun is being fired in the lowest positions. Again, the upper part of the seat is made in two halves, and is hinged in front so that the two parts can be swung round horizontally to form elbow-rests when the gunner desires to adopt the reclining position. A sliding bolt is provided to lock the seat in any position. There are only five clamping handles on the mounting, and they are all arranged to operate downwards. The handle for the adjustment gear is detachable, and it serves also for clamping the top carriage.

The following are particulars of the mounting:—

Weight of mounting—45lb. = 20·5 kgs.
Maximum elevation (training pivot vertical)—16 deg.
Maximum depression (training pivot vertical)—4 deg.
Slope of ground on which the mounting can be adapted with training pivot vertical—from 5 deg. descending to 60 deg. ascending.
Lowest position, line of sight—16 in. off the ground (406 mm.).
Highest position, line of sight—32 in. off the ground (812 mm.).
Sixteen turns of the adjusting handle serve to raise the mounting from the lowest to the highest position.

A naval landing limber has been specially designed for carrying this adjustable tripod mounting. The limber itself carries 7000 rounds of ammunition and has the usual accessories and entrenching tools, and is so formed that the tripod can be mounted on it so that it is ready to be fired even in transit. The ammunition is accommodated in seven compartments, and four seats are provided. It is scarcely necessary to enter into details regarding the construction, but one important feature is that everything is strongly made, and the experience of Messrs. Vickers has been utilised to ensure reliability even with the severe treatment inevitable in heavy country.

The following gives the weights of the gun, tripod and limber:—

Weight of gun	28 lb.	=	12·7 kgs.
Weight of tripod	45 ,,	=	20·5 ,,
Weight of limber with 7000 rounds of ammunition	1240 ,,	=	562 ,,
Total	1313 ,,	=	595·2 ,,

Auto-mobile torpedoes.

Writing in the *Naval Annual* for 1910, Vice-Admiral Sir Sidney Eardley-Wilmot, in reviewing the position of the Whitehead torpedo as a weapon for use at sea, remarked that "greater simplicity and much higher velocity seem essential to give this form of attack a more assured position in naval warfare." Some time has now elapsed, and it is interesting to again review the position of the torpedo and see to what extent either or both of the above requirements have been actually met in practice. Before doing this, however, it is perhaps desirable to point out to anyone who may refer to the *Naval Annual* for 1910 that one particular feature, at any rate, which was not then existing must be mentioned if the torpedo is to be given its true value. In comparing the Whitehead torpedo with a 12-in. gun, the inference was made that the gun, at any rate, possessed an effective range of something like double that of the torpedo. As a matter of fact, the effective range of the Whitehead torpedo now equals if it does not actually exceed that of the gun. The fact that the torpedo maintains for the whole of its course a definite depth eliminates altogether the chances of missing its object due to variations in the trajectory curve, and, as recent practices have borne out, a torpedo fired, say, at the centre of a line of ships in single column line ahead, the chances are only two to one against some ship being hit, even up to ranges of 10,000 yards. Consequently it is only reasonable to believe that with a considerable number of torpedoes fired without any particular objective, but at the centre of a fleet, there exists every probability that some will, in actual practice, hit one or other of the ships composing the fleet; and since at the ranges now possible with the torpedo, torpedo craft, or even the smaller fast cruisers, would be practically at a safe distance, the possibility of successful daylight attack with the torpedo has to be seriously reckoned with.

As is well known, the Whitehead torpedo has, in the course of its development, tended to increase in size, and the majority of torpedoes being manufactured at the present time for our own or foreign Governments are of the 21-in. diameter type. This larger torpedo, on account of the increased weight of charge carried, and on account of its increased speed and length, is considerably more formidable than the previous type of 18-in. torpedo, although this latter is still preferred for some torpedo craft and submarines. In the gradual growth towards the increased size the torpedo has remained fairly constant as regards the ratio of length to diameter; consequently, the 21-in. torpedo is in the neighbourhood of 22 ft. long, and possibly represents the limit in size that present-day launching tubes and appliances for handling render convenient or even possible.

Speaking generally, it may be said that all torpedoes under construction at the present time are fitted with superheaters for heating the air, and many have added to this generators for converting water into steam, which, added to the heated air, more than doubles the efficiency that could be obtained from the compressed air charge alone. But with these improvements, complications in machinery and the necessity of greater care in handling bring up again the original question as to whether greater simplicity has resulted in the last two years. It certainly cannot be claimed that torpedoes can be more simply adjusted now than they were formerly, but there is a tendency—certainly abroad—to construct torpedoes for one range and one speed only, and with these limitations the torpedo can be more simple and efficient. But assuming that the principle of one range one speed is generally adopted, it means that two torpedoes are required for carrying out the best form of day and night attack: a long-range, slow torpedo is most desirable for day attack, whereas a short-range and high-speed torpedo is more suitable at night; and the present tendency is to provide two separately designed torpedoes to fulfil these two differing conditions.

The following table shows the present speeds and ranges of the torpedoes constructed by Messrs. Whitehead & Co., of Fiume. There is also shown the amount of explosive carried in the head.

Speeds and Explosive Charge of Torpedoes.

Diameter of Torpedo.	Speeds.				Explosive Charge.
	1000 yards.	3000 yards.	6000 yards.	8000 yards.	
in.	kts.	kts.	kts.	kts.	lb.
18	42½	—	27	—	209
21	—	41	—	27	330

Torpedoes.

The torpedo department of Messrs. Armstrong, at Elswick, has been extremely busy during the past year. The demand for torpedo-tubes, both for submerged discharge and above-water discharge, has been very considerable. As regards the submerged discharge, a new problem had to be faced in providing for a greater length and weight of the 21-in. torpedo. It was found by shipbuilders extremely inconvenient to provide space for the loading of the 21-in. torpedo axially in the tube. This operation was difficult enough with the 18-in. torpedo, but the greater length of the 21-in. torpedo made it excessively difficult to find sufficient beam space to enable this operation to be performed.

To meet the difficulty Messrs. Armstrong designed and have

perfected a submerged tube into which the torpedo can be introduced from the side. The arrangements adopted are extremely ingenious and simple in their operation. As in the previous well-known Elswick submerged torpedo-tube, compressed air or gas is admitted into the outer tube in rear of the piston, and this drives the piston forward. When the piston with the attached shield has travelled to a certain distance, a large valve in the axis of the piston is allowed to open, admitting the pressure to act on the torpedo itself, and force it out. The increased weight of the piston and shield necessitated the employment of new methods to bring them to rest at the completion of their stroke. Pneumatic, hydraulic or spring buffers are used for this purpose. The large side-door requires power for its operation. A smaller power motor, either electrical, hydraulic, pneumatic or steam, working through a series of levers, actuates this door without difficulty, and at the same time carries the torpedo into its position in the piston.

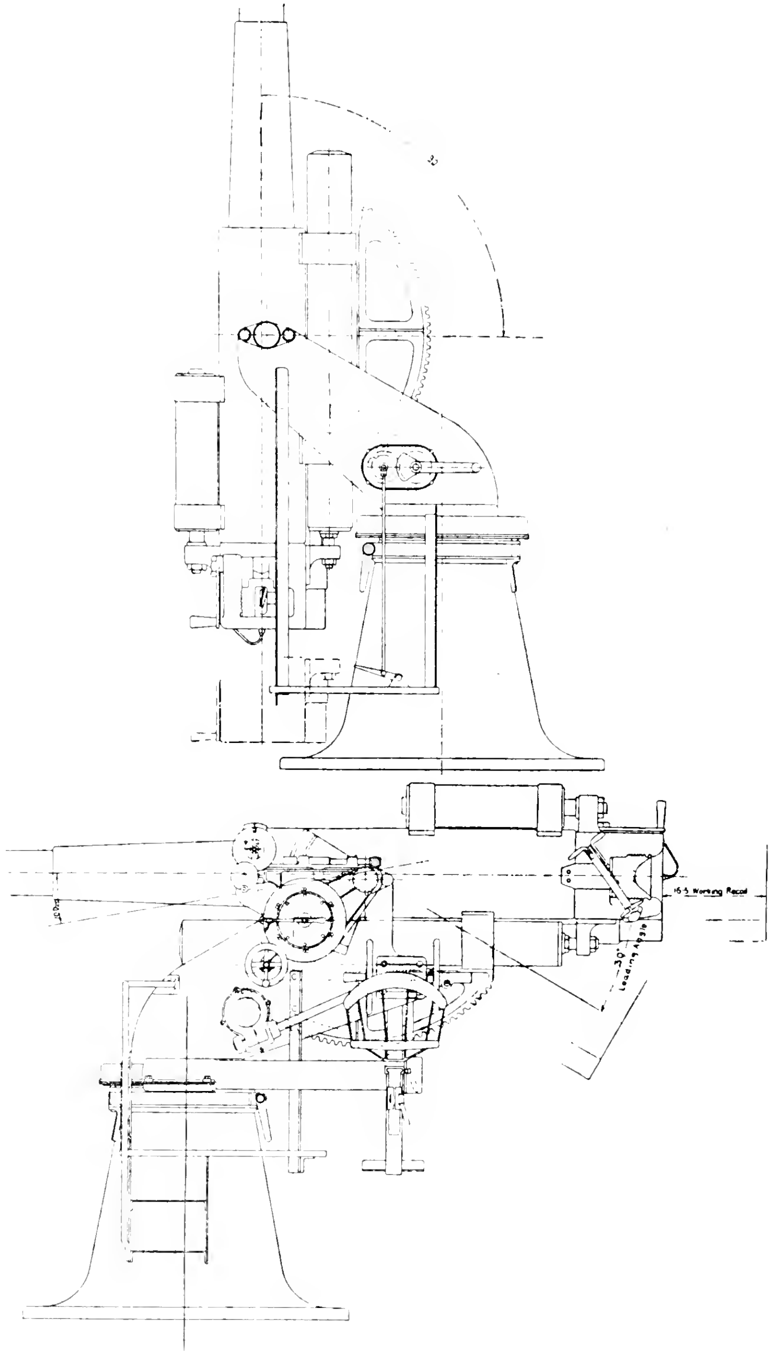
As regards above-water tubes, Messrs. Armstrong have carried out a large number of experiments with the object of perfecting arrangements for above-water discharge, and to produce a tube which will ensure accurate ejection of the torpedo, combined with lightness and facility of working, with due regard to strength. They have evolved such a tube, and have constructed a large number of them for different navies.

Gun mountings for airship attack.

The advent of the airship and the aeroplane, and the rapid and widely entertained growth of opinion in favour of their potentialities in war, has naturally occupied the attention of the designers of ordnance, and on the following page is illustrated the system designed by Messrs. Vickers for enabling the 4-in. 40-cal. and the 3-in. 50-cal. guns to be mounted on pedestals on board ship, in order to give a high angle not only for use against aerial fighting machines, but for other purposes where a high trajectory is desired. Little need be said about the guns, as they are of the firm's standard type. The chief interest is associated with the mounting.

The mounting consists, first, of the usual cradle with recoil cylinder and running out gear, the springs of the latter being arranged in a single column enclosed in a steel tube secured to the underside of the cradle, to be readily removable for adjustment. Second, a carriage of the usual Y shape, having side cheeks carrying the trunnion bearings and a vertical pivot, with suitable elevating and training gear operated by handwheels, and a platform and seat for the man operating these elevating, training and sight wheels, as well as one for the operating and quick loading gear. Third, a pedestal with a training wormwheel at the upper end, and roller bearings at the top and bottom and a ball-thrust bearing.

The elevating gear is the most novel feature, and five turns of the handle suffice to raise the breech from 90 deg. to 30 deg. for loading. As shown on the drawings published on page 304 the elevating arc is secured to the cradle by the brackets which carry the running out springs, while the pinion is carried on a hollow cross shaft on the upper carriage. The left-hand end of the shaft is arranged to receive a sliding clutch, which engages with a wormwheel. The boss of the clutch



Vickers' S.A. 4-inch (10 cm.) 40-cal. High Angle Pedestal Mounting.

screws into the boss of the wormwheel with a quick pitch screw. A sliding bolt locks the clutch to the wormwheel. The wormwheel is mounted on a sleeve which carries a pinion gearing with a rack which swings on the trunnions and carries the sighting gear. By this means the movement of the sight coincides with the gun when the elevating gear is operated. One turn of the handwheel elevates the gun 2 deg.

The loading gear is worked from the right hand of the mounting, the crank handle being geared to the cross-shaft by spur wheels. The sliding bolt is withdrawn by the foot lever and the clutch disengages itself automatically from the wormwheel when the loading gear is operated.

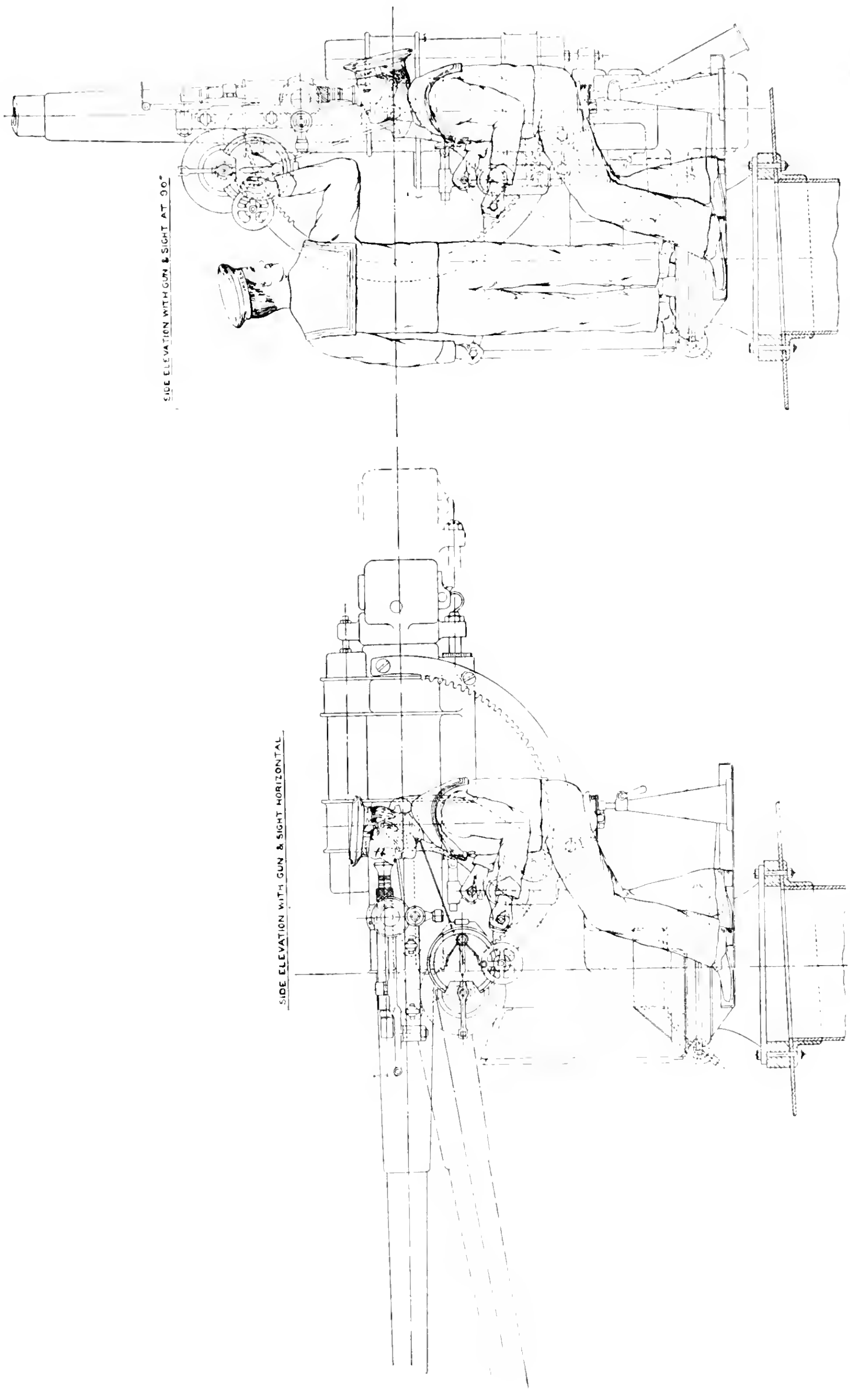
The training gear consists of a wormwheel on the top of the pedestal secured by means of a friction clamp so as to relieve the gear from excessive shock. Gearing with the wormwheel is a worm connected by bevel gearing to the training handwheel. The worm runs in an oil bath and is fitted with ball bearings and an adjusting device for taking up wear. The elevating and training handwheels are carried on the same bracket. The handle of the training wheel is fitted with a pistol with electrical firing gear so that the operator may fire the gun without taking his hand off the wheel. One turn of handwheel trains the gun 3 deg.

The sight is connected to the arc pivotally mounted on the left hand trunnion, and has arrangements to correct the ranging angle automatically for the different pointing angles. The telescope is of special design, having the eye-piece at the side for convenience in sighting at high pointing angles. The pawl for actuating the semi-automatic gear is attached to a bracket on the cradle, on the right-hand side of the mounting. The pawl can be thrown out of action when using the gun as quick-fire instead of semi-automatic by means of a small lever actuated by a handle on the right hand side of the mounting.

Messrs. Armstrong have also introduced a pedestal mounting for the 3-in. semi-automatic gun for balloon or torpedo-boat attack. The gun and its mountings, shown on page 306, are designed to form the ordinary armament of torpedo-boat destroyers, and in addition to be suitable for attacking airships. For these combined purposes the training and elevating mechanisms of the mounting are arranged to give large and rapid movements to the gun and sight both in direction and elevation. As a rapidly moving airship may appear suddenly from any direction and at any altitude, it is necessary that the sights should be capable of being aligned on it in the shortest possible time. For this reason the sights are arranged so that the gunlayers always look in the direction of the object aimed at and bring it into the field of the sighting telescope by the aid of open sights. The mounting is sighted on both sides, the sights being cross connected to give the same range and deflection to each sight. The gunlayer on the left elevates and aligns his sight in elevation only, and fires. The gunlayer on the right trains and aligns his sight in direction only. The range and deflection is set by a third man or sight setter.

As accuracy and rapidity of aiming and firing depend on the gunlayers being well supported and steadied in the most convenient positions for using the telescopes and the elevating and training handwheels, both the gunlayers are provided with seats, each having a footrest and a breastrest.

The eyepieces of the telescopes are slightly in front of the trunnion axis, and are so placed that they follow, when elevating, the natural movements of the gunlayer's or trainer's eye when looking upward at



Sir W. G. Armstrong, Whitworth & Co.'s System of Semi-Automatic Gun on Pedestal Mounting for Balloon or Torpedo-boat Attack.

an object in mid-air. The pivot round which the sight bar rocks when giving angles of elevation for range coincides with the trunnion axis, so that any alteration of the setting of the sights for range very slightly affects the position of the telescope eye-pieces. The pedestal round which the carriage revolves when training is internal and the carriage is supported by a ball-bearing.

Auto-matic rifle.

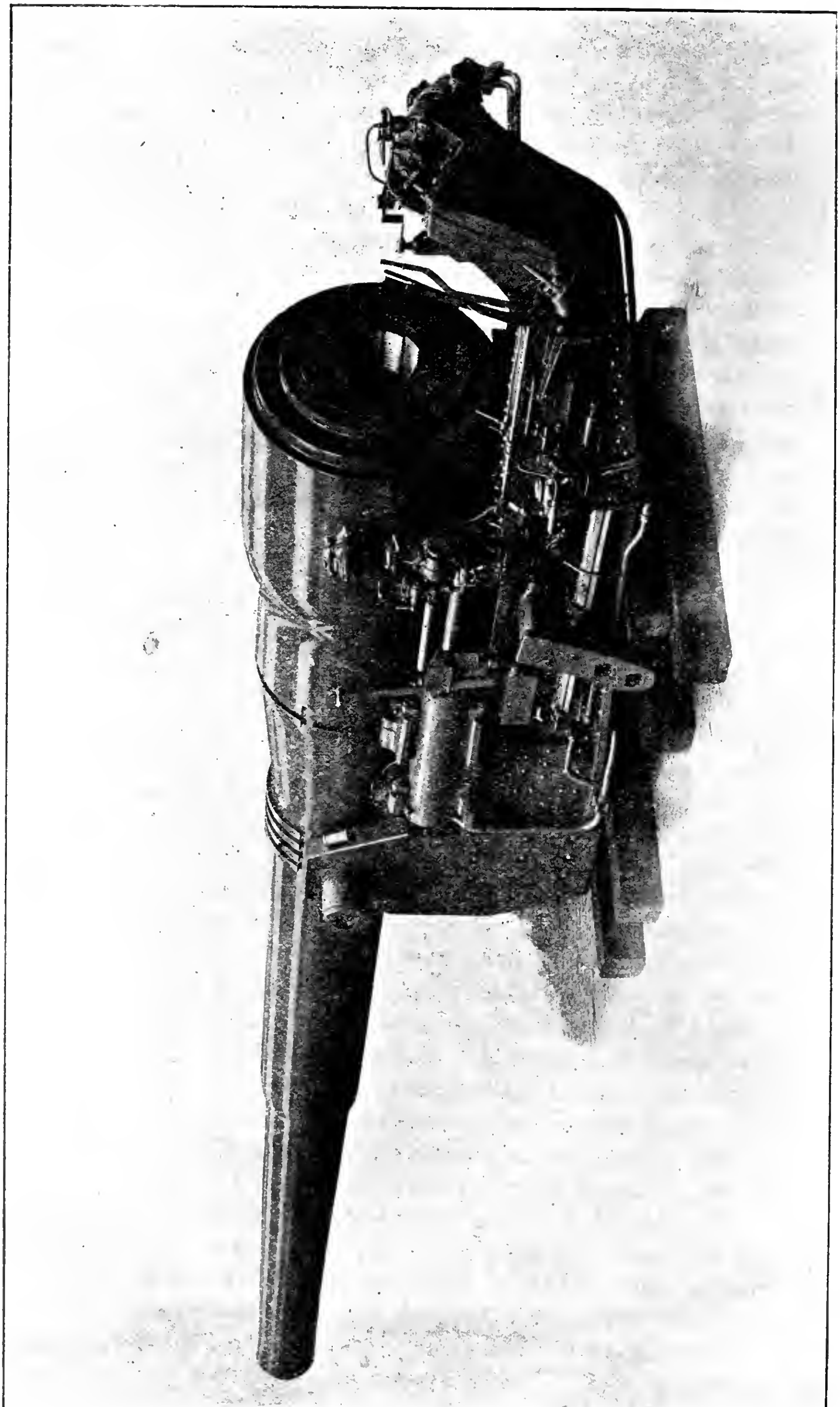
Messrs. Vickers have recently completed an automatic rifle which, to judge from the very successful trials which have been carried out with it, promises to be a great advance on any weapon of this type yet produced. Owing to the careful balancing of all the parts and the long recoil of the mechanism, the force of which is absorbed by spiral springs, the "kick" has been reduced to a minimum, and with the rifle in question it is possible to fire a long series of shots at great rapidity without unduly tiring the man. All he has to do is to fill the magazine from a clip and press the trigger for each shot without removing the rifle from his shoulder or taking his attention from the object aimed at.

The force of recoil developed by the explosion of the charge is used to unlock the breech and reload the rifle automatically. The mechanism comprises very few parts, which are simply and strongly constructed. All the working parts can be taken apart and put together again with great facility, and the assembling of the rifle is a quick and simple operation which can be performed without any tools, a cartridge only being required. The whole mechanism is self-contained and can be removed from the rifle in one operation, and, when in position, is so covered in that the rifle is practically dust-proof.

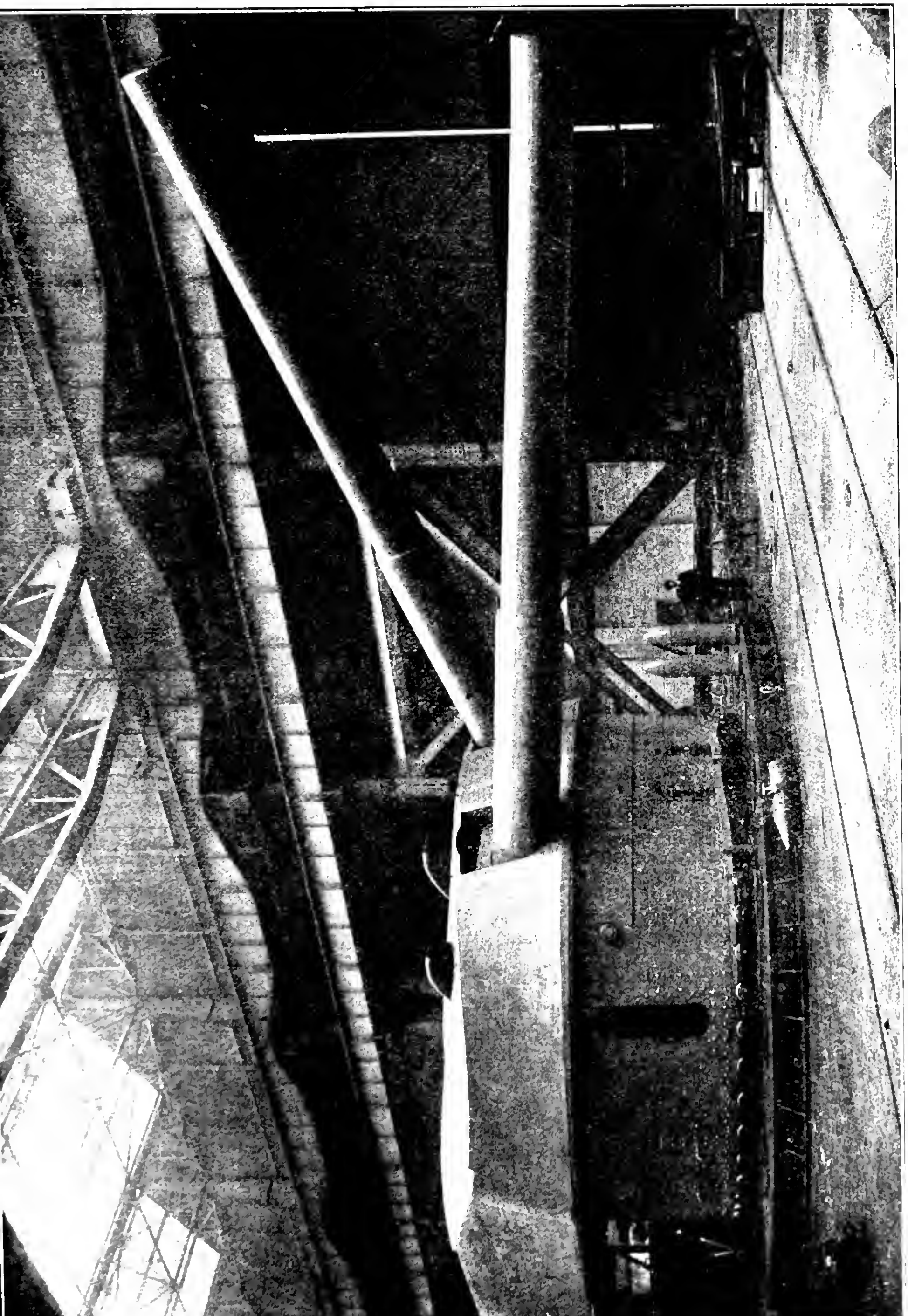
The rifle is constructed to fire high-velocity cartridges with pointed bullets, giving a velocity of over 2800 ft. secs. The magazine is constructed to take five cartridges, but, if required, the capacity can be increased to take a greater number of rounds. The gun is arranged so that it can be used as an ordinary magazine rifle, and is changed from automatic to single fire by simply turning a small lever on the side of the rifle; it can then be operated by using the bolt lever as in an ordinary magazine rifle. The weight of the rifle has been kept as low as possible without in any way impairing the efficiency of any of the mechanism details or of the barrel.

Coventry Ordnance Works.

The expansion of the Coventry Ordnance Works during the last year has been considerable. In order to deal with the increased volume of work and ensure rapid delivery, large additions have been made to the plant of the Company, new shops fitted completely with machines of the latest types being installed at both the Coventry and Scotstoun Works.



Coventry 13·5-in. Gun.



Coventry 13·5-in. Mounting for "Conqueror."

Amongst the many other innovations introduced during the last year the following are of general interest:—Designs of guns for the attack of aeroplanes and balloons are being produced and promise to be very successful. Various models of an entirely new design of automatic rifle are being manufactured at the works. These models can be arranged to be functioned by gas, or recoil, and are being adapted for different sizes and classes of ammunition. An experimental automatic rifle calibre machine-gun has been manufactured and passed through successful trials. The mechanism is similar to that of the automatic rifle, and the designs allow great advantage in weight over existing types, and also have the advantage that when supplied in conjunction with the rifle no special training of the troops is required for the use or care and maintenance of the machine-gun.

Fuses.

Extended and most satisfactory experiments with fuses for high explosive shell have been carried out, and the fuse design shows several novel features, especially as regards safety arrangements.

Amongst the improvements introduced into hydraulically worked mountings is a hydraulic sight. The arrangement is such that the power required to raise or lower the sight is supplied by a hydraulic cylinder, the movement of which is controlled by a rotating valve operated by the range dial spindle. The range dial is revolved by hand in the usual manner. A feature of this arrangement is that the dial can be placed behind the sight where there is ample space in the turret. Also all mechanical gearing, and consequent backlash, is obviated. The optical part of the sight can be passed either vertically or horizontally through the gun-house armour. Owing to the small power required to turn the range dial, this sight readily lends itself to any method of director-control from a central position. Another novel feature in connection with hydraulic mountings is an improved ramming and cordite tilting by means of which the total time previously required to load any given type of gun is materially reduced.

The 6-in.–4-in. high and low velocity and 12-pdr. designs of mountings have been improved and brought up to date in the light of recent experience.

As regards the number of contracts now in the hands of the Coventry Company rapid strides have been made during the last few years. Guns of various sizes, including the very largest manufactured, have passed successfully through proof, and several contracts for guns up to the largest sizes are now being executed for the British and other Governments. The five twin 13·5-in. hydraulic mountings for the Conqueror have all been tried with marked success in the pits at

the Scotstoun Works of the firm, and the gunnery trials of these mountings at sea will probably have been carried out before this volume is in print. The manufacture of the five similar mountings for the Ajax (the order for which was placed during the latter part of 1910) is nearing completion. A further order for a set of five heavy mountings for a battleship of the 1911–12 programme has recently been received. A new Coventry design Mark VII. of a 6-in. upper deck shielded mounting has recently been accepted by the Admiralty, and an order for a number of these mountings is in hand. Several contracts for various sizes of the Coventry-Holmstrom breech mechanism have also been made.

The services of Mr. Howard Wright, the experienced designer and manufacturer of aeroplanes, have been secured for this firm, and his factory, where monoplanes and biplanes of all descriptions have been produced during the last few years, has been purchased by the Company and incorporated as an Aviation Department. Special machines are being designed for competition in the War Office Military Aeroplane Trials, 1912, and are now approaching completion. The services of Mr. T. Sopwith, the experienced English aerial pilot, have also been retained. The Company is therefore in a position to supply aeroplanes of all kinds of designs both for flight over land or water.

Messrs. Beardmore & Co.

Messrs. William Beardmore & Co. during the past twelve months have been making further experiments with tubular cordite in a 12-in. gun with results that are not only satisfactory but tend to show that the power of guns may be considerably increased without any loss of "life," or that for the same power the "life" may be considerably prolonged.

Their attention has also been given to the question of suitable weight of projectile for modern conditions of warfare, i.e., at long ranges; weight can only be gained usefully by increased length, and this brings in the question of rifling as affecting the stability of the projectile. Given sufficient stability at the long ranges, it is obvious that the heavier projectile, by retaining its velocity better, will be more effective for perforation of armour, and has also the great advantage of carrying a longer bursting charge.

The firm's gun factory at Parkhead is in process of extension, to meet the growth of their business in the manufacture of ordnance, and a complete new shop for the manufacture of breech mechanism of all sizes has been installed during the past year. Mechanism for a number of 13·5-in. and 9·2-in. guns is now being manufactured by them for the Admiralty and War Office.

In the gun-mounting department a new design of hand-worked mounting for a 6-in. gun has been completed and is under trial. It

is very questionable whether such a heavy gun as a 6-in. 50-calibre can be efficiently worked by hand in a seaway with considerable motion on the ship. The improvements introduced in this mounting materially add to its efficiency in this connection. A description of this mounting is given on page 285.

As regards armour, the year 1911 has not witnessed any startling developments. In the Parkhead Works, however, there have been improvements made in the present quality, with the result that a greater uniformity is now obtained. Evidence of this fact is shown by the consistently good results obtained at firing trials on plates selected from supplies.

The output of the firm was not so large as in the previous year, the reason being that extensive additions were being made to the plant, which hindered to some extent the regular work. The additions—viz., several new treating furnaces, a 10,000-ton bending press, and a new armour-rolling mill—are now working, and the plant is now capable of producing 10,000 tons of armour per annum.

The belt armour for the Conqueror was completed during the year, also the barbette armour for the King George V., Ajax and Audacious. One branch of armour manufacture which has been improved considerably during the year is that of armoured communication tubes. Those now produced are equal, if not superior, to face-hardened plates of equal thickness. A considerable quantity of deck plating also has been finished. This material is now subjected to firing trial, several plates from supplies having been tested with excellent results. This firing trial is purely a shock test, the plate being attacked at an acute angle to line of fire. When it is considered that this material is not subjected to treatment, or at most to a simple annealing after rolling, it is obvious that the material must be of a superior class.

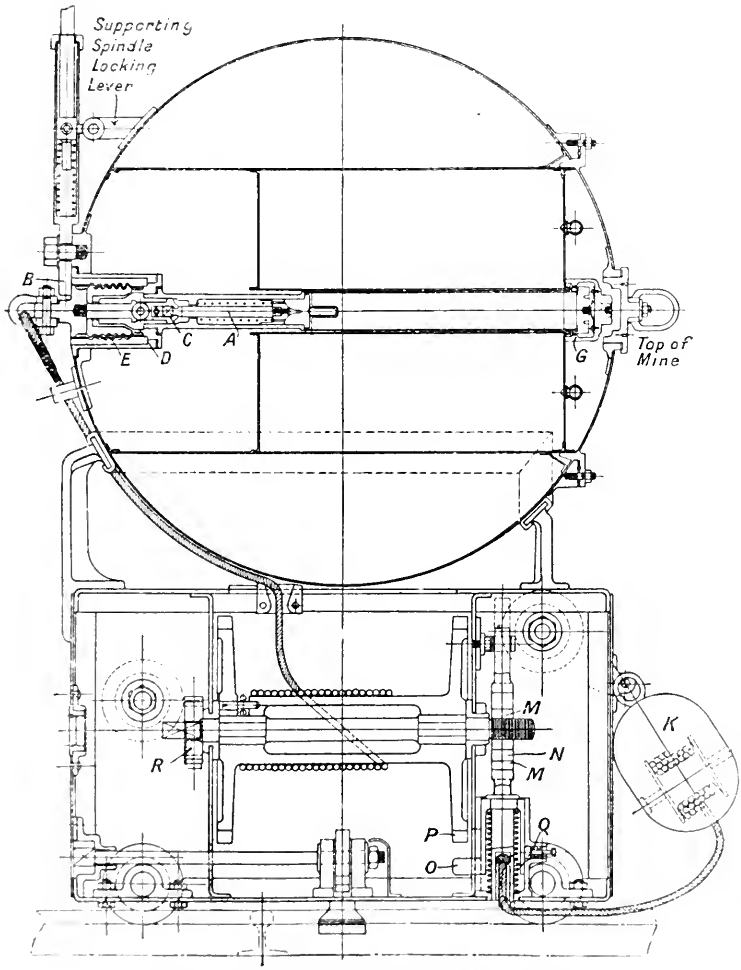
Elswick ignition system.

Messrs. Armstrong have introduced a revised method of igniting the cordite charges of guns which have the De Bange system of obturation. The intention of this improvement is to diminish the risk of accident when charges which have the igniting material attached to the bag are being handled in the gun-house or magazines. Furthermore, it does away with any danger that may be attached to stowing cartridges which have their igniting material attached in the magazines. The Elswick system provides for the lighting primers to be kept and handled quite apart from the cartridge. Special arrangements are made in the mushroom head of the obturator for receiving the priming charge.

This subject is an interesting one, and no doubt further developments of it will be followed with considerable interest.

Within the past few years there has been ready and convinced recognition of the great potentialities of the automatic submarine mine. This is a direct consequence of experience in recent wars, and of the improvements made in the mechanical features of these instruments of destruction to ensure safety in handling them on land

Automatic submarine mines.



Vickers' Automatic Submarine Mine (No. 5a).

and on board mine-laying ships, to effect precision in laying them, particularly in respect of the depth of submersion below the surface, and to achieve efficiency in action.

In the Russo-Japanese war great destruction was wrought by mines, and the number of ships sunk by these instruments quickened interest and stimulated experimental research towards improvements

in respect of safety, precision and efficiency. Now there is full confidence in their potentialities. Sir George Clarke, a great authority on all matters of defence, said, some years ago, that " the fact that the whole question of submarine mine defence has been allowed to remain in the hands of experts who ignore naval requirements and the practical conditions of war accounts for much misdirected energy and some evident danger." Therefore, it is well that the question has recently been taken up by a firm who make a continuous study of the necessities of war as an element in the solution of the mechanical problems associated with the manufacture and use of war munitions. Messrs. Vickers, whose aim it is to meet all naval requirements and the practical conditions of war, were compelled by the success of the submarine mine in the Far East to take up this weapon, and the result has been most interesting.

Success in mining.

In connection with the automatic type of mines, the essential conditions to be fulfilled are as follows:—The firing gear must be delicately adjusted in order to ensure explosion of the charge with the slightest shock due to the contact of the passing ship, and yet provision must be made so that the mine cannot be fired prematurely either on land or in the mine-laying ship or when being launched into a "field." The depth of immersion under the surface must be constant and precisely as predetermined, irrespective of the distance between the surface and the bed on which the floating mine is to be anchored. A further desideratum is that in the event of one or two mines exploding the adjacent ones should not be fired: this it will be recognised is a difficult condition, as the concussion of the water resulting from the explosion of one mine tends to disturb others as greatly as the contact of a passing ship, especially in the case of a sensitive mine. These conditions are met in the Vickers mine as a result of experiment and practical tests.

The patent type of mine which is illustrated on page 313 obviates any possibility of either the shock or wave motion set up by the explosion of one mine affecting others.

This mine is globular in form, and is fitted with a lever which projects beyond the mine, and is deflected radially from its set position when the mine comes in contact with the ship, and rolls along the side of the hull. The action of this contact lever releases the firing gear, which is then actuated by the buoyancy of the mine. The lever is locked by a spring-supported spindle, so that the shock must be one of considerable force. A submerged log, for instance, would not be sufficient to displace the lever from its locked position. The lever and its mechanism is placed on the bottom of the spherical mine. On it there is a stop, B, so that only when it is forced radially through a certain arc by contact with the ship can the mine be fired. Percussion is achieved when the projection B has cleared the end of the striking mechanism.

The firing gear is unlocked, a direct pull is exerted on the spindle. It will be seen that at C there is a forked crosshead, each end terminating in a bulb to fit over the concave head of the striker spindle A. As the forked crosshead is drawn outwards, its ends drop into the enlarged part D, releasing the trigger spindle A, which, impelled

by its spring, rebounds against the detonator. At E there is introduced an elastic joint, to ensure that the firing mechanism is not affected by sea-water. The contact lever prevents detonation until it is struck by a passing ship. There is the further provision that this lever cannot operate until a sal-ammoniac seal is melted, which can only be accomplished after the mine has been immersed. At the same time there is a plug, G, at the top of the mine, which permits the igniting charge to be withdrawn through the cover over the detonator cylinder, which is screwed in place at the last moment before immersion.

Many trials have been carried out with these mines to establish their safety before immersion, their efficiency when they came in contact with ships travelling at even the lowest practicable speed, and the accuracy with which they can be immersed and anchored at a predetermined depth from the surface. To accomplish this last-mentioned result there is an anchoring chamber and a winch with paying-out cable, which is seen alongside the actual flotation chamber in the section on page 313. The paying-out cable is connected to the end of the spindle actuating the firing gear, and passes through a cursor on to the drum of the winch. The cursor is of soft metal, being easily removable, while the cable is of steel, so that there is no excessive wear of the cable. The section on page 313 shows the mine complete in transit on a bogie on rails. The projection at the bottom is simply a brake in connection with the transit arrangement.

When launched the weight K is detached, and drops for the whole length of the sounding-line, which is fixed in any particular mine at the depth at which the mine itself is to be immersed under the water surface. This weight, which acts as a plumb-line, is, as seen, supported in a cavity on a spring-loaded spindle, in order that when the weight touches bottom, the tension of the spring is released, so that the spindle, actuated by the spring, drives a pawl into the pinion of the paying-out drum. As soon as the mine is floated the cable begins to pay out, the anchor chamber sinking.

To the end of the shaft of the paying-out winch there is secured a threaded extension, in contact with which is a square nut M, which, under normal circumstances, bears against the spindle carrying the pawl for engagement with the toothed pinion of the winch. Ultimately this nut clears the spindle, but so long as the weight is acting on the spindle it cannot rise in the guide N. As soon as the weight touches bottom, and the pull upon the spindle ceases, the spring forces the spindle through the groove up the guide N until the pawl O enters into one of the teeth in the wheel P, arresting the motion of the paying-out winch. At the same time, the spring-loaded stop Q advances into the spindle cavity, retains the spindle in the highest position of its vertical travel, and thus clamps permanently the toothed flange on the winch. The action of this apparatus is thus positive, and definitely and permanently clamps the winch. In this way it is impossible for the winch to rotate in any way, so that even strong currents have no effect upon the degree of immersion of the flotation chamber of the mine.

From the foregoing description it will be understood that as the winch ceases to pay out when the weight of the sounding-line has reached the bottom, and as the weight of the winch drags the flotation chamber downwards with it, the final mooring position of the flotation chamber will be a distance from the surface equal to the length between the anchoring chamber and the weight on the sounding-line.

Exhaustive trials have been made of this anchoring system to determine the accuracy in the depth of immersion of mines designed

on this principle. Four mines were used for this series of tests. In each case there was brought into operation a hydraulic brake mounted on the shaft of the paying-out cable at R, and the strength of this brake, which regulates the speed of the sinking of the anchor, varied from about 4·4 to 15·4 lb. The mines were lowered from the deck of a ship, and the sounding-weight was dropped into the sea at the same time. In no case did the degree of immersion actually obtained exceed 20 per cent. of that desired. In the case of immersion of a little more than 3 yards (3 mètres) the result was in the worst case only 6·66 per cent. in excess of that aimed at; with about 5½ yards (5 mètres), immersion 6 per cent.; and with about 8¾ yards (8 mètres), immersion under 4 per cent.

The speed of immersion was tested in several trials in a depth of water of 72 to 75 mètres. The predetermined depth of submergence was 5 ft. in water of a depth of 75 mètres, and the time taken to anchor was 32 seconds, giving a speed of about 2·3 mètres per second. With a depth of 72 mètres the time taken was 28 seconds, giving a speed of practically 2½ mètres per second. A test was also made to determine the maintenance over a prolonged period of the depth of immersion. The depth of water was 10 mètres, and the depth of immersion was decided upon as one mètre. After 6 hours it was found that there was no change in the depth of immersion, allowance being made for the rise of the tide. Upon the mine being dismantled it was found that there was no leakage into the firing mechanism. Another mine was similarly immersed for 23 hours at a depth of 9 mètres from the surface, and here also absolute water-tightness was thoroughly established upon dismantling and examination of the interior.

Of equal importance is the design of suitable mechanism for launching or laying and mooring the mines in waterways, and to the devising of satisfactory mechanism Messrs. Vickers and Captain Elia have devoted much experimental research.

FOREIGN POWERS.

United States.

In the course of a review of ordnance matters during 1911, Rear-Admiral N. C. Twining, Chief of the Bureau of Ordnance, remarked that progress had been rather in the direction of improving and developing existing types than in any marked changes. There had been no revolution, and no upheaval seemed to be indicated. The increasing efficiency of the submarine, the torpedo and the aeroplane,

had caused naval officers and ordnance authorities to look forward to the time when these factors of warfare might cause new demands to be made in matters both of ordnance and ship construction, but up to the present time the proposals had been merely tentative or speculative. The contest between the gun and the armour-plate was still going on, but the Chief of Ordnance thought the gun had now the balance of advantage, and still more powerful types of guns were contemplated.

Ordnance.

In the United States Navy the standard heavy gun is the 14-in. of 45 calibres, and for torpedo defence a 5-in. of 51 calibres. The following table shows the superiority of the modern guns over their predecessors. (The last gun given in the table is the army and coast fortress gun, and has been added to show how it differs from the naval gun. Its nitro-cellulose charge is 329 lb.)

Calibre.	Length in Calibres.	Length.	Weight.	Muzzle Velocity.	Weight of Shell.	Muzzle Energy.	Extreme Range, Ship Mounting.	Penetration in Krupp Armour.
ins.		ft.	tons.	foot sec.	lbs.	foot tons.	yds.	ins.
5	40	17	3·1	2,300	50	1,852	7,000	2·3 at 6,000 yds.
5	51	22	5·0	3,150	50	3,439	12,000	3·0 at 6,000 yds.
12	45	46	53·6	2,850	870	48,984	22,000	15·2 at 10,000 yds.
12	50	51	56·1	2,900	870	51,944	24,000	15·6 at 10,000 yds.
14	45	54	63·3	2,600	1,400	65,687	21,000	15·9 at 10,000 yds.
14	40	46	..	2,150	1,660	57,285		

The superiority of the naval 14-in. over the 50-calibre 12-in. is due in some measure to the increased steadiness of the projectile during flight, which is the advantage arising from its added weight, and the "hitting power" is greater, although the extreme range of the gun as mounted on board ship is less. The nitro-cellulose powder charge employed is 370 lb. The 5-in. torpedo defence gun is regarded as effective up to its extreme range of 12,000 yards. The short length and low muzzle velocity of the army 14-in. gun have caused some comment. It is understood that they were adopted in order to minimise the effect of erosion, and reduce the cost of re-lining. It is held that this policy, if once justifiable, is so no longer, since it gives the Army a gun inferior to that it may have to meet, thereby sacrificing the great advantage shore guns should possess—viz., the ability to outclass the enemy's ship's ordnance.

Erosion.

With regard to erosion, Rear-Admiral Twining says that the effect is due probably to the action of the powder gases on the metal of the gun as softened by the high temperature to which it is exposed, being about 4000 deg. F. The process of re-lining has hitherto consisted in boring out the interior of the gun, shrinking in a

new tube, and then boring and rifling again. The facility of the operation is in future to be increased, and the cost greatly reduced by building all guns with liners slightly conical and susceptible of easy removal. In this way the time required for re-lining a big gun will be reduced from 75 to 25 days. From other sources it appears that no appreciable results have been attained from experiments with powder and special banding of the shell, but some changes in the form and pitch of the rifling are said to promise a likelihood of increasing the life of a gun from 150 to 200 rounds. The question of bands is still under consideration. There is in the naval appropriations for the first time this year a charge (125,000 dols.) for re-lining guns, and it is anticipated that an annual continuous appropriation for this purpose will be necessary. At the present time the cost of a liner for the 12-in. gun is 4000 dols., and of inserting it 6500 dols., which is about 17 per cent. of the cost of a new gun.

Powder. The nitro-cellulose powder, which replaced the prismatic brown powder, is still the standard propellent in the United States Navy, and Rear-Admiral Twining claims for it that when not affected by climatic or other unfavourable circumstances it will retain its qualities and continue serviceable for from twelve to fifteen years. If deterioration should occur, warning is given by the physical appearance of the powder, so that spontaneous combustion or explosion is never to be apprehended, and it is extremely doubtful whether spontaneous combustion is possible unless the powder should be subjected to abnormally high temperatures. Rear-Admiral Twining says that the powder is extremely satisfactory in stability, ballistic characteristics, and keeping qualities, and that there is no better smokeless powder in the world. The propellent is constituted of cotton dissolved in nitric acid, and dried and colloided. The material is then passed through a mechanical press and comes out in long strips and rods, which are cut into the required lengths. The form of grain used for large-calibre guns is multi-perforated, the perforations being longitudinal, so that the burning of the powder is constant and the gas pressure practically unchanged during the time in which the projectile is travelling from the breech to the muzzle. If powder should become deteriorated ballistically, it is reworked, the process being analogous to the *radoubage* of the French. The grains are ground in water and the paste dried, and the material worked much as in the case of new powder.

Shells. With regard to the shell used in the United States Navy there is little to report. Rear-Admiral Twining says that the projectiles are "being slowly but surely improved." They are all capped, with

the exception of the 5-in., the body being of hard and tough forged steel, containing alloys of nickel, chrome, vanadium and other metals, and it is in the composition and treatment of the steel that advances have been made towards giving hardness without brittleness. "These points are, in the main, manufacturers' secrets, not disclosed even to Government officials." The problem of making a high-explosive shell capable of penetrating armour and carrying a sufficient bursting charge appears not yet to have been satisfactorily solved. The proposal to employ a shell carrying a large explosive charge, to detonate on contact, finds no favour officially. Great damage might be done by the Isham shell, but the damage could not be comparable to the effects of a shell bursting inside armour. The Puritan trials confirmed the official opinions previously held on this point.

Gun mountings.

With regard to the mounting of guns in United States warships there has been strong objection to the introduction of the triple turret system. It is true that it would lead to a reduction in the weight of armour carried, but there is the danger of three guns being put out of action instead of two, as well as of complications occurring in the matter of ammunition, turret machinery, concentrated weights, and other features. But, nevertheless, says Rear-Admiral Twining, the time "seems now to have arrived when the necessities of ship design and tactical considerations have forced the triple turret, and it is interesting to note that Russia, Austria, Italy, and the United States have all incorporated it in their latest battleship designs. It is now decided that United States battleships Nos. 36 and 37 (Nevada and Oklahoma) will each carry the triple turrets as a part of their main armament. These turrets will embody certain new ideas in gun-mountings which have not yet been embodied in any foreign design." He adds that "for secondary gun-mountings compactness and lightness are essential, but to attain them, without sacrificing the rigidity which is necessary for accurate firing, requires ingenuity."

The Bethlehem Company.

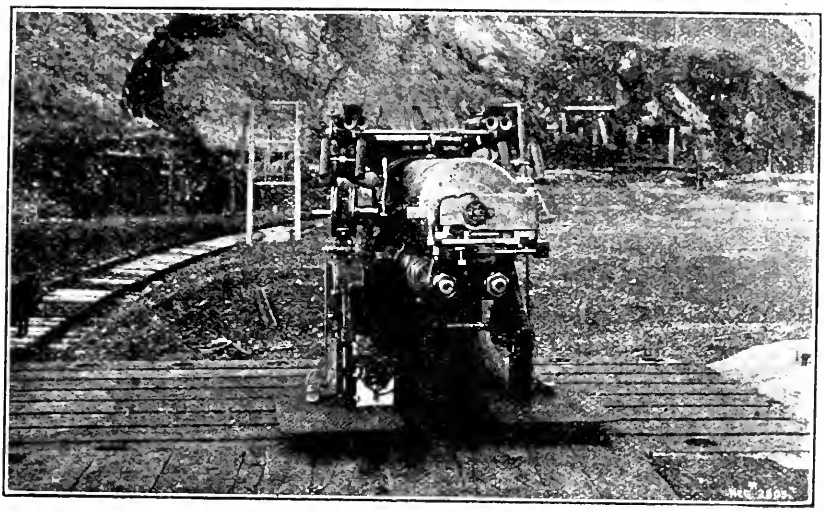
In this connection it is interesting to note that the Bethlehem Steel Company have several new designs of electro-hydraulically operated turret gun-mountings, and that their works are busily engaged in turning out such turrets, which have given very satisfactory results in trials carried out to determine the flexibility of control of the various gun and ammunition supply machinery installed in the turrets. As is well known, the electro-hydraulic installation consists of a constant speed and continuously running electric motor driving a variable delivery hydraulic pressure pump, which supplies oil under pressure to an hydraulic motor, which operates the gun machinery. This combination in itself is not new, and is used in American, Russian, and Japanese turrets, and even on pedestal gun-

mountings, but up to the present the weakest unit in the power transmission scheme has been the hydraulic speed variator itself, and the durability of the variators has left very much to be desired. Two causes have contributed to the unfavourable results referred to, viz., the unequally distributed load on the large ball thrust-bearings and the wearing of the valve face of the cylinder barrels and the face of the valve plate. In some types of swash plate hydraulic transmission machines the cylinder barrels are rotary, and work on a fixed valve plate, whilst in some proposed machines it is the valve plate which rotates. As the valve ports have to be of a certain area to pass the requisite amount of pressure fluid, it is impossible to reduce the diameter of the valve faces as much as might be wished, and consequently the limit of rotary speed is reached in a 30-H.P. machine at about 400 r.p.m.; otherwise the life of the valve port faces is very short. This is a very slow speed for the modern electric motor, and it means either a heavy and cumbersome motor or a reasonable size of motor and gearing between the motor and the pump end of the hydraulic speed variator.

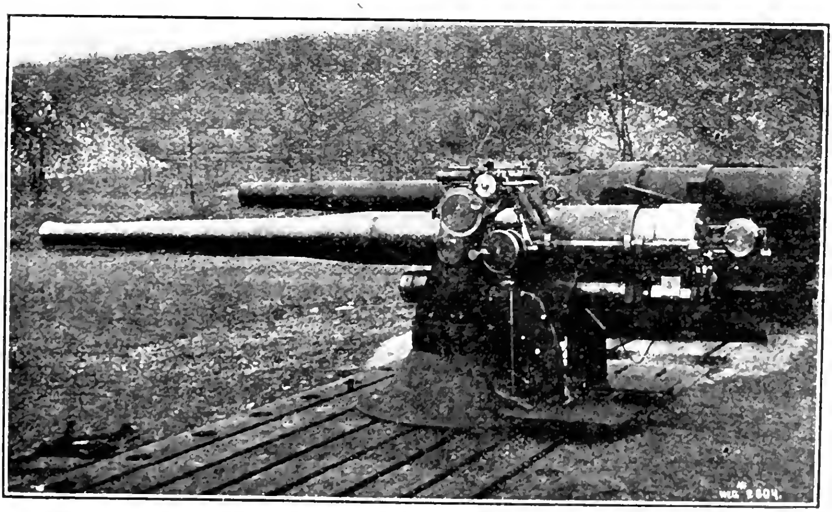
The Bethlehem Steel Company have therefore decided to use a machine which does not require any ball bearings at all, and which does not employ rotary valve faces, and consequently a 15-H.P. machine for the elevating gear of a heavy gun can be connected direct to a motor running at 1000 r.p.m., whilst a training speed variator of 30 H.P. can be run at 800 r.p.m. To control the speed and direction of rotation of the gun, turret and ammunition hoist, the Bethlehem Steel Company use a variable throw crank-pin of an ingenious construction which governs the amount of fluid sent to the hydraulic motor, and the throw of the crank-pin is altered by a small hydraulic servo-motor. This combination ensures that the exertion on the part of the operator is very slight, and as the control is by means of the double hand-wheels described in the 1909 *Naval Annual*, it is easy to imagine that the control of a heavy turret causes no fatigue to the gun layers and trainers.

Gun trials.

The Bethlehem Steel Company are making large numbers of anti-torpedo armaments for their own and other Governments of 4-in., 5-in., and 6-in. calibre. As typical of Bethlehem design in small mountings two photographs are reproduced on page 321 showing a 4-in. gun and mounting (side and breech end views) which have several interesting features. The gun is of 50-calibre length and of the "all-steel" design, using fixed ammunition with a long pointed shell of 31 lb. of nitro-cellulose powder, brass cartridge case and combination electric and percussion primer. The M.V. is just over 3000 f.s., and to illustrate the great range of this gun it will be only



BETHLEHEM 4-IN. GUN (REAR VIEW).



BETHLEHEM 4-IN. GUN (SIDE VIEW).

necessary to mention that at 5 deg. elevation the average range for ten rounds was 7970 yards, whilst twelve shots with 9 deg. 30 min. gave a mean range of 10,768 yards. These facts speak very highly for the happy combination of gun, powder, and shape of projectile. The mounting when used in torpedo-boats or destroyers is fixed on a pedestal having an unusually large base, so as to reduce upward and downward deck stresses to a minimum. The recoil of the gun is absorbed by two brake cylinders below the gun, and these cylinders also contain the running-out springs. The Bethlehem "Two Hand" elevating and training wheels are used, and there is also a two-speed change gear fitted to each mechanism, actuated by the foot pedals shown on the platforms. The cross-connected sights are of the Bethlehem Rock Bar type with eccentric adjustment for range.*

San Marcos firings.

An account was given in the *Naval Annual* last year of the experimental firing at the San Marcos, but the following comment from the military point of view, published in the *Journal of the United States Artillery* (July–August, 1911), is peculiarly interesting and deserves to be reproduced:—

> For the coast artillery, the work on the San Marcos raises some rather disquieting questions. Heretofore, it has been generally conceded that for reasons inherent to the comparatively unstable gun platform offered by a ship, as well as her inability to determine ranges with great accuracy (both of which advantages are possessed to a high degree by the coast artillery), a man-of-war could not open an effective long range fire upon a sea-coast battery. As the old saying went, "A gun ashore is worth more than two afloat." This estimate of the situation is now, by some, questioned. Excepting the absence of a return fire, the firing of the New Hampshire on the San Marcos closely paralleled the conditions that would obtain between a ship and a low-sited direct-fire battery ashore, namely, the firing ship had a stationary target, comparatively quiet water to manœuvre in, and selected her own range, which she varied at will. In the absence of definite experimental knowledge, the effect of such fire upon a battery's *matériel* and *personnel* is problematical. The utter lack of overhead cover is, by the Navy, considered a very weak feature of our style of emplacement. Naval officers express the belief that after the first salvo the emplacements would be swept with fragments of shell and splinters of concrete, enveloped in clouds of fumes from exploding shell and dust from the earthern parapets in front, and the gun carriages (especially those of the disappearing type) would be so clogged with *débris* carried over from the parapet that they would soon cease to function. On the other hand, the ship being in motion, continually clears herself from her own smoke. Furthermore, that all battery-commander and primary stations erected at, or in the immediate vicinity of, the battery would be speedily wrecked. Under such conditions they say it would be impossible for the battery to make any effective reply. They also point out that a single battleship of the latest type, with its broadside of ten or twelve 12-in. guns, outclasses the direct-fire armament of most of our forts; and that a division of four such ships could bring to bear a fire far superior to any that could be brought against it (even if the shore batteries could reply). Regarding the fire from mortars, they admit this is a harder proposition, but are inclined to discredit the ability of mortars to hit a rapidly moving target, frequently changing speed and direction, at the long ranges now used. They also claim that they would speedily "knock out" the various observing and plotting stations by which the mortars are directed, wherever they are visible and exposed, as at Fort Monroe and many other forts.

* In the photograph showing the side view of the gun, the projection from the breech, which is just seen in front of the breech block, is not part of the breech mechanism, but part of a bore telescope which had inadvertently been left in place.

Rear-Admiral Twining considered the most striking lessons of the firing to be: 1. The fact that, at ranges of 10,000 and 12,000 yards, the New Hampshire could place her shots on any portion of the ship at will, thus proving the accuracy of her spotting and pointing. 2 The tremendous havoc wrought in the San Marcos by the passage or bursting of entering shell.

The Chief of the Ordnance Bureau's opinions on the torpedo question are interesting. He says that while the torpedo continues to be held in great favour as a weapon of under-water attack, it must be admitted that no navy has at present an adequate system of defence against such attack if efficiently delivered. Torpedoes.

Torpedo nets as carried by the vessels of some foreign navies are ineffective, since torpedoes have been designed which can cut, penetrate, or displace the nets. The searchlight is ineffective, since a torpedo may be successfully launched at a range beyond its reach. Gunfire is ineffective against an invisible target, and the torpedo-boat can launch its weapon while still invisible to the gun. Pickets and scouts are not thoroughly effective, since they may themselves be attacked and disabled, or they may be eluded. The practical torpedo of the present day may be effectively used at a range of 8000 yards; a range of 10,000 yards at 27 knots speed is confidently expected in the near future. The United States' Navy now has in course of building two types of torpedo which will, beyond a doubt, fill these conditions, and may exceed them. The reliability of the torpedo in the hands of the general service is, unfortunately, still questionable, and many failures and wild shots are to be expected. There is, however, nothing mechanically impossible in the conditions of the problem of making torpedoes reliable, and recent advances in this direction justify the hope that in the near future a thoroughly accurate long-range weapon will be produced.

Although there is no change to record in the character of the armour employed in the Navy of the United States or of any other country, there is a marked advance in the methods of armour-making. The Krupp steel plates manufactured in the United States and tested in 1905, though they resisted penetration, showed considerable flaking round the points of impact; while a plate of last year's make, which has been illustrated, showed that it had been attacked by four A.P. projectiles, of which none had perforated, and that there was practically no flaking. Armour.

To meet the increasing power of guns and the penetrative effect of shell, the American ships are now receiving thicker armour, and the Bureau of Ordnance has even had a plate made 18 in. thick, which has been tested with a view to a possible future demand for armour of that thickness. Thin plates of greatly increased resisting power are now made for turret and conning tower tops with a nickel-chrome-vanadium alloy, specially treated, which gives very satisfactory results.

Krupp armour is made in the United States by the Midvale, Carnegie and Bethlehem Steel Companies. The Krupps in Germany endeavoured to restrict the operations of the Midvale Company on the ground of alleged infringement of certain American patents, but

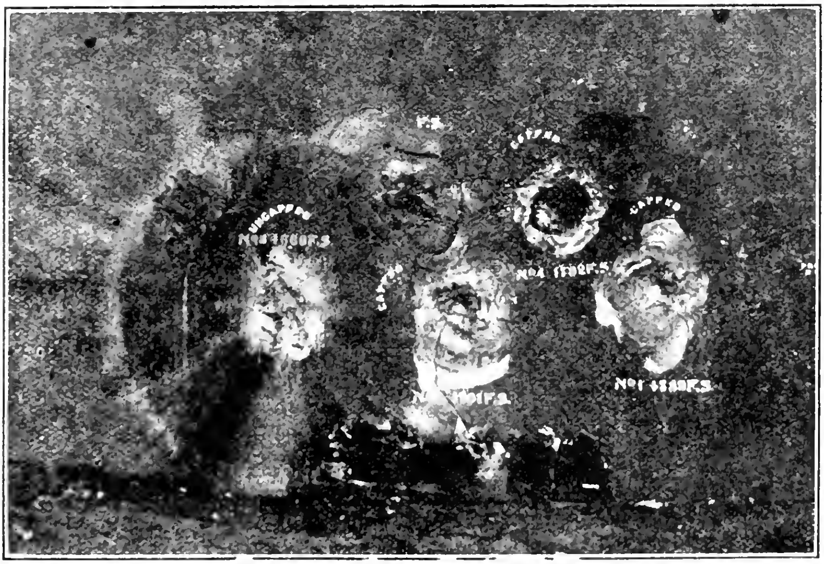
some of the patents were held by the District Court of Pennsylvania to be invalid and the others not to have been infringed, and the decision was upheld successively by the Circuit Court of Appeal and the Supreme Court, to which the action was carried. Great gratification was caused by the success of the Carnegie Steel Company in securing the contract for the supply to Italy of 4600 tons of armour plating which, for reasons not fully explained, the Terni Company were unable to deliver. The contract price was a little more than £85 per ton, while the French Schneider group is stated to have asked £94, Messrs. Cammell Laird £107, and Messrs. Krupp £108. The Bethlehem Company has been very successful in turning out armour-plate, and they have now their works busy with American and European orders.

Two of these plates are illustrated. They were respectively of 12-in. thickness, reducing to 5 in. and to 6 in., in each case with 6-in. oak backing and $\frac{5}{8}$-in. skin plating, and the angle of fire was normal.

The lower 12-in. to 5-in. plate was tested at Indian Head in the early part of October last, in the presence of the Chilean Commission. The plate was attacked by six 12-in. capped a.p. projectiles and one 12-in. uncapped a.p. projectile. The first five projectiles, being capped, were fired at striking velocities averaging 10·8 f.s. higher than the prescribed velocity (1514 f.s.), and the maximum penetration, as will be noted from the accompanying reports, was $4\frac{1}{4}$ in. In the case of the sixth shot, an uncapped 12-in. a.p. projectile, brought to 870 lb. weight, was used, with the idea of assimilating as nearly as possible the conditions under which armour ballistic tests are generally conducted in Europe. This shot was fired with a striking velocity of 1660 f.s., and the estimated penetration was 3 in. The seventh shot, using a 12-in. capped a.p. projectile, was fired with a striking velocity of 1793 f.s., or 279 f.s. higher than the prescribed velocity. In the case of this shot the penetration measured 15 in., but as the plate was only 12-in. thick, a cone must have been pushed out of the back of the plate as the projectile did not penetrate into the oak backing.

The upper plate represents a group of 6-in. armour, and was attacked by three 6-in. capped a.p. projectiles, weighing 105 lb. each, with velocities averaging 1·6 f.s. higher than the prescribed velocity (1648 f.s.). It appears from the report and photograph that the maximum penetration effected was from $1\frac{1}{2}$ to 2 in. It may be noted that the lines which appear to the right of the photograph and seem to be hair cracks in the plate, are only defects in the original photograph from which the one for the illustration was copied.

Bethlehem Plate, No. 123281 B1 F1.



Bethlehem Plate, No. 123076 B1.

TEST OF PLATE.
UNITED STATES NAVAL PROVING GROUND,
INDIAN HEAD, MD.

August 30, 1911.

Maker, Bethlehem Steel Co.
Lower Plate.
Thickness Backing 6-in. Oak.
Number of Securing Bolts 6.

Class "A," thickness 5 in. to 12 in.
Skin Plate $\frac{5}{8}$ in. Angle attack normal.
Number of Armour Bolts 32.

Impacts.	1	2	3
Gun No. and calibre	12-in., 35·9	same	same
Rounds fired to date	71	72	73
Projectile used and maker	W.S.A.P., lot 3, 1908	same	same
Length of projectile	capped	same	same
Diam. of bourrelet	11·965	11·968	11·967
Diam. of body	11·929	11·940	11·939
Diam. of band	12·139	12·140	12·139
Diam. of lip	12·294	12 294	12·294
Weight of projectile	870 lb.	same	same
Type of band used	3 in. 2 grvs.	same	same
Flight (by screen)	smooth	smooth	smooth
Powder used	S.P.245	same	same
Charge, pounds	97 lb.	95 lb.	96 lb.
Striking velocity	1514D–1543	1514D–1507	1514D–1528
Dimensions of impact	11 × 12	9 × 10	9 × 10
Dimensions flaking	28 × 37	17 × 32	15 × 19
Distance from top	67	70	82
Distance from left	96	144	52
From nearest impact	No	50	47
Dish	$\frac{1}{8}$	$\frac{1}{4}$	No.
Penetration	$4\frac{1}{4}$-in.	3-in.	3-in.
Cracks	No	No	No

TEST OF PLATE.
UNITED STATES NAVAL PROVING GROUND,
INDIAN HEAD, MD.
TEST FOR INFORMATION OF CHILEAN GOVERNMENT.

October 2, 1911.

Maker, Bethlehem Steel Co.
Lower Plate.
Thickness Backing 6 in.
Number of Securing Bolts 6.

Contract Group Ship
Class "A," thickness 12 in. to 5 in.
Skin Plate $\frac{5}{8}$ in. Angle attack normal.
Number of Armour Bolts 32.

Impacts.	1	2	3	4
Gun No. and calibre	12 in. 35 calibre, Number 9			
Rounds fired to date	89	90	91	92
Projectile used and maker	Wheeler-Sterling, armour piercing, 1908, Lot 3			
Length of projectile	38·450	38·374	35·853 uncap.	38·430
Diam. of bourrelet	11·982	11·980	11·971	11·980
Diam. of body	11·967	11·941	11·938	11·946
Diam. of band	12·143	12·139	12·138	12·138
Diam. of lip	12·299	12·298	12·295	12·298
Weight of projectile	870 lb.	870 lb.	870 lb.	870 lb.
Type of band used	3 in., 2 grooves			
Flight (by screen)	smooth	smooth	smooth	smooth
Powder used	S.P.245	S.P.245	S.P.245	S.P.245
Charge, pounds	98 lb.	96 lb.	113 lb.	129 lb.
Striking velocity	1539 (D. 1514)	1507 f.s.	1660 (D. 1673)	1793 (D. 1800)
Dimensions of impact	9 × 10	10 × 11	6 × 7	12 × 12
Dimensions flaking	24 × 27	23 × 35	10 × 26	22 × 30
Distance from top	82	87	84	66
Distance from left	148	108	69	130
From nearest impact	42	29	33	20
Dish	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{3}{8}$	$\frac{5}{8}$
Penetration	$1\frac{1}{4}$–$2\frac{1}{4}$	$3\frac{5}{8}$	3-in. Est.	12 in.
Cracks	Plate developed a few cracks on face during fire.			

Remarks . . . . Penetration of 4th shot measured 15-in. deep, but as plate was only 12-in. thick a cone must have been pushed out of back of plate as the shell did not penetrate into oak backing.

TEST OF PLATE.
UNITED STATES NAVAL PROVING GROUND.
INDIAN HEAD, MD.

November 15, 1911.

Maker, Bethlehem Steel Co.
Upper Plate .
Thickness Backing 6 in.
Number of securing bolts 4.

Class "A," thickness 6 in.
Skin plate $\frac{3}{8}$ in. Angle attack normal.
Number of armour bolts 12.

Impacts.	1	2	3	
Gun No. and calibre	6 in. 40 calibre, Number 559			
Rounds fired to date	331	332	333	
Projectile used, and Maker	Wheeler-Sterling, Mark "A" 1902, Lot Number 4.			
Length of projectile		capped		
Diam. of bourrelet	5·964	5·965	5·964	
Diam. of body	5·928	5·932	5·930	
Diam. of band	6·115	6·119	6·116	
Diam. of lip	None	None	None	
Weight of projectile		105 lb.		
Type of band used		$1\frac{1}{8}$-in. old type		
Flight (by screen)		smooth		
Powder used		S.P. 512		
Charge (lb.)	12·2	12·2	12·1	
Striking velocity, D. 1648	1648	1657	1644	
Dimensions of impact	$5 \times 5\frac{1}{2}$	6×6	$5 \times 5\frac{1}{2}$	
Dimensions, flaking	12×16	8×10	13×16	
Distance from top	41	42	42	
Distance from left	60	81	37	
From nearest impact	None	21	23	
Dish	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	
Penetration	$1\frac{1}{4}$ in.	$1\frac{1}{2}$–2 in.	1–$1\frac{1}{2}$ in.	(Estimated).
Cracks	None	None	None	

FRANCE.

The Liberté disaster, some particulars relating whereto are given below, overshadowed the French Navy for a period, but did not check its activities, and will not be without some reacting advantages. There are evidences of a more vigorous policy, and of a more alert and energetic disposition in officers and men. It has been decided to adopt the 13·4-in. gun—ten of them in five turrets on the keel line—for the three ships which are to be laid down this year. There were diverse opinions as to the wisdom of the adoption of a bigger gun. Many officers were well content with the 12 in. and its *obus alourdi*, which has given great satisfaction; but on the whole it is recognised that, other navies having taken the initiative in adopting a larger calibre, it would have been difficult for the French Navy to be content with an inferior gun. The only fear is that in the near future it may be necessary to apply to the 13·4-in. gun the same reasoning which has been applied to the 12 in. The shell to be employed with the new gun will weigh $1190\frac{1}{2}$ lb., and will carry an explosive charge of a little more than 55 lb. of mélinite. Ballistic details and the characteristics of the gun seem not to be known. Ordnance.

Although these shells may appear relatively light, they are much more powerful than the 960-lb. 12-in. shells, carrying 26·6 lb. of mélinite, with which the Dantons are provided. The new ships will have magazine capacity for 1000 of the 13·4-in. shells, as well as for 6950 shells for the 5·5-in. guns. These latter projectiles will weigh 67·2 lb., and will contain about $2\frac{1}{2}$ lb. of mélinite.

Projectiles.

In the summer of last year at Gâvres there were satisfactory trials of the *obus alourdi* of the 12-in. gun in comparison or competition with projectiles of similar character made abroad. The result was entirely favourable to the national industry. The plate successfully attacked was of Krupp steel, 9·4-in. thick, and so convincing was the result as to the quality and effect of the shell that many persons thought the 12-in. gun was good enough. But the fact that the shell had perforated a plate of the thickness mentioned was, of course, no proof, as was soon pointed out, that the same projectile would be equally efficient against 12-in. or heavier plating. As is shown above, the authorities have not been moved by successful trials of the 12 in. to be content with that calibre. There is a new shell known as "P," said to have been tried in 9·4-in. calibre against the old Neptune. It is adapted for two fuses, one to detonate on striking thin plating and the other intended to operate after perforating thick armour.

Gunnery.

Although the French Navy has made great strides towards higher efficiency in the matter of gunnery, there is still much to be done before the desired level is attained. There have been some adverse criticisms in France, which have been reproduced in Germany, and have not given a very pleasant impression. Certainly the practice of the Second and Third Squadrons off the Hyères Islands last October had encouraging features. The target was fixed, but hits up to 57 per cent. were obtained at ranges which had been increased by order of M. Delcassé from about 7000 mètres to over 8000 mètres (8722 yards). The Justice nearly beat her record of 50 per cent. of hits last year, and next came the Gaulois, Charlemagne, Démocratie and Jauréguiberry. The best results were attained by the Brest Squadron. Much of the credit for inducing keener interest in gunnery is due to Admiral Germinet. The returns of the whole year, however, do not show that the interest is fully maintained, and some observers do not consider the work entirely satisfactory. Possibly the authorities are themselves to blame in the matter. In what are known as the *tirs d'honneur*, being competitive exercises, the results are sent to the Ministry in Paris, and are there subjected to a process of standardisation, involving calculations which are said to remove the results from proper direct relation to the actual

firing. Moreover, a considerable time is allowed to elapse before the reports are published, so that it is perhaps not surprising that some of the interest and keenness evaporate.

Armour.

There is very little to be said about the armour-plate question in France. Not much is known as to what is being done, and the probability is that progress is upon the old lines, with the production of somewhat thicker armour. The national factories were regarded with particular favour during a Parliamentary debate on the relative merits of Government and private establishments. The latter were said to be giving large dividends to their shareholders at the cost of the State, and though there was some misunderstanding in this point, there can be no doubt that the Government establishments are doing their work economically. The national armour-plate factory at Guérigny was said to produce plating at a price from 40 to 50 per cent. under the prices of private works. It was also asserted that at Guérigny light and deck plating was being turned out at 80 per cent. less than the cost it could be procured at from other sources. Accordingly, the Guérigny factory is to be enlarged, with new plant, and is expected to produce one-fifth of the armour which will be required for the ships to be built under the new Naval Law, in this way affecting a considerable saving to the country.

The Liberté.

The catastrophe by which the battleship Liberté was destroyed on September 25, in the harbour of Toulon, has been described in Chapter II.

A committee of naval officers, under the presidency of Rear-Admiral Gaschard, was appointed to inquire into the whole of the circumstances, and to report on the subject. The evidence of survivors and observers was taken in order to reconstruct the sequence of events, determine the causes of the catastrophe, and, if possible, to assign the responsibilities. The inquiry was exhaustive, and the report was dated October 21, on board the Justice, being signed by the Rear-Admiral and the members of the committee, Captains Ytier and Schwérer, Commander Gilly, Chief Engineer of Naval Artillery Breuilh, and Lieutenants de Rothiacob and Le Dô. It was transmitted to the Minister by Vice-Admiral Bellue, commanding-in-chief, with the comment that it did not deal explicitly with the question of responsibility, that it showed that all the regulations relative to the preservation of powders on board had been observed, and that the internal service of police and guard had been executed according to regulations on the night preceding the catastrophe. "In these conditions, in my opinion, no responsibility can be sought on board."

The report of the committee was as follows:—

(1) That there was not any trace of malevolence;

(2) That the hypothesis of a fire breaking out in the neighbourhood of the 7·6-in. magazines on the starboard side or in the magazines themselves was disproved;

(3) That the catastrophe was due to the ignition of a cartridge of powder in one of the two forward starboard magazines, and nearly certainly in the upper magazine, in which was stored a single lot of powder known as B.M. 13, A.M. 8, 2·06 P.B. (the second lot of B powder, amylic alcohol, of 1906 from Pont de Buis).

In employing the expression "spontaneous ignition" (*inflammation spontanée*) the committee did not altogether exclude the consideration of the intervention of some foreign body as a possible agent of fire, though regarding this as highly improbable, and having relation merely to packing materials. Most of the members thought the distinction too fine, because ammunition was received in sealed cases. They exchanged views as to possible improvements in the system of storage and the preservation of powder on board, as also concerning proper assurance of security against fire and malevolence; and they thought that some improvements for these purposes, not calling for any profound changes, might be introduced. It was necessary to reduce the age of the powder kept on board ships of war, foreign nations having preceded France in this matter. "It is but too clearly proved by accidents and catastrophes in the French Navy, and by the loss abroad of the Maine, Mikasa, and Matsushima, to take account of the most notorious incidents only, that tests of a purely scientific character, applied up to the present time, are insufficient."

Before the report was published, instructions had been issued, on the advice of the committee, that no powder of a greater age than four years should be kept on board the ships, and that the order should become effective progressively as ammunition of greater age could be disembarked and replaced. Admiral Bellue anticipated the order by discharging all powder received before 1902 from his ships, as well as all supplies for training purposes. All the B.M. 13 powder belonging to the lots which were stored in the 7·6-in. magazines of the Liberté were ordered by the Minister to be immediately disembarked from the ships and to be returned to the Ordnance Department. These were lots 1·07 P.B. (Pont de Buis), 2·06 P.B., 7·06 P.B., and 9·06 P.B., and they were to be subjected to a rigorous examination *brin par brin*. As a result of this examination and

inquiry large quantities of the incriminated powder were taken out to sea and sunk in deep water.

Some of this powder which was regarded as dangerous had been refreshed (*radoubée ou remalaxée*) by treating with alcohol or ether, or mixing with other powders. Upon the manner in which the powders have been treated and mixed a good deal has been said, and light was thrown upon the situation by an embittered quarrel which arose between M. Maissin, Director, since December, 1906, of the Pont de Buis Powder Factory, and his predecessor, M. Louppe, who had taken over the management of the Moulin Blanc Factory which M. Maissin had vacated.* A joint Naval and Military Committee was appointed in October to investigate the situation further, and some other inquiries were made. It was shown that singular processes of mixing powder had prevailed both at Sevran-Livry and Pont de Buis, and that while M. Maissin reproached his predecessor, M. Louppe, at the latter place, the same dangerous methods continued. One lot of powder delivered from Sevran-Livry in 1909 contained a mixture of powder of 1908, 1906, and probably 1904 and still earlier dates. At Pont de Buis very hazardous methods were adopted. There was a lot of powder of 1908, which contained a large proportion of *poudre radoubée* of 1901, composed of powder manufactured several years earlier, so that the 1908 powder really contained a proportion of powder made in 1896, or even 1895. This arrangement became possible under an instruction of 1907, which reversed orders of 1901, the view being taken that the age of the powder did not affect the matter. "L'âge n'entre pour rien en ligne de compte."

The result of the various enquiries and reports has been the enforcing of a new organisation at the factories, and the adoption of an age system for the retention of powder on board ships. M. Painlevé, in his report on the Estimates for 1912, advocated the following rules:—(1) The mixing of powders whose age differs more than three months to be forbidden. (2) All processes described under the terms *remalaxage* and *radoubage* to be interdicted. (3) A rule of manufacture to be established conformable to indications given by the Senate Committee of Inquiry and the Inter-Parliamentary Committee. (4) The department of powders to be managed largely by chemists possessing the diploma of the great chemistry schools, while the laboratory education of the pupils of the polytechnic school is widened. (5) There should be handed over to the Navy one of the existing gun-cotton factories and two of the powder factories, and the Navy to have its own expert authorities. (6) Establish a "genealogy" of the existing powders, disembark those which are

* The Iéna disaster occurred on March 12, 1907.

old, and keep them in isolated places, instead of sinking them in deep water. (7) Apply, at least provisionally, an age limit of six years—four years aboard, and two years in magazines on shore. (8) Establish a permanent control of the Navy over the manufacture of its own powders. (9) Do not keep ammunition in watertight compartments. (10) Keep the temperature of magazines low and constant, banish all paint-work and other inflammable material, perfect the flooding arrangements of magazines, increase the power and pressure of water for the purpose, and make the arrangements automatic.

Magazine flooding.

Much has been said regarding the failure to flood the magazines of the Liberté, but the Naval Committee of Inquiry attributed no blame to anyone on this head. The flames spread with great rapidity and violence, and the powder gases made the air incapable of being breathed. Men fled where they could, spreading panic, and many jumped overboard. The sick bay was invaded by flames, and the terror of the situation may be realised by the ghastly picture conjured up by a single sentence of the report. "Quelques matelots étaient tellement brûlés que le corps de l'un d'eux ressemblait à une poupée de cire en train de fondre." When the flames died down, dense smoke from burning linoleum, hammocks, and other material made it impossible to see. Lieutenant Garnier, the senior officer, took command of the operations, endeavouring to quell panic by sounding general quarters. Engineer Lestin informed him that it was impossible to approach the forward part of the ship on the lower deck, and he then gave orders to flood the forward magazines. It was impossible, however, to execute the order owing to the smoke and intense heat, and at the very moment of the explosions several brave young officers and men were endeavouring to operate the gear for flooding the magazines amidships. It is doubtful if the forward magazines could have been flooded even if the sluices had been opened, in view of the arrangements that existed. Water will not penetrate a closed compartment where a great gas pressure is developed; the pipes and valves were almost at once put out of action by the fire; and the fact that the controlling gear was near the magazines made it impossible to operate them. Such apparatus and appliances might be useful in case of fire near the magazines, but they were found useless when the fire was in the magazine itself. These facts have been brought home to French naval constructors, and in the new ships there will be a system of magazine flooding by water under pressure, capable of being operated from one or more distant stations.

Germany.

Little that is exhaustive or conclusive can be said of progress in ordnance matters in Germany, owing to the secrecy which is now observed in regard to everything that is new. The lack of definite information has led to the publication of many surmises and speculations, and "Nauticus" itself regrets the lack of knowledge in regard to many naval things. The substitution of the 12-in. gun for the 11-in. began with the Helgoland class, and in the latest class afloat, the Kaisers, there are only ten of these weapons instead of twelve, disposed generally as in the plan of the Hercules. It may be assumed with confidence that a larger gun will be mounted in the later ships, and two new guns, each of them designed in three calibre lengths, 40, 45 and 50, have appeared this year for the first time in the Krupp tables of ship and coast guns. These are the 34·3 cm. (13·56-in.) and the 38 cm. (14·96-in.). A 35·5 cm. (14-in.) gun was in the tables last year, and may possibly precede the 14·96-in. in introduction to the fleet. Ordnance.

The Germans have not adopted the larger calibre without reluctance. "Nauticus" this year remarks that the necessity of engaging at extreme distances requires the larger gun, and enforces the greater importance of broadside than of bow and stern fire. The effort to increase the effective fire of individual rounds leads to increase of calibre, and with it to greater penetration and explosive power. "Nauticus" observes that increase of calibre is bound up with reduced rate of fire, the diminished "life" of guns, the smaller number of rounds carried or fired, and the impossibility of properly training effective reserves. The erosion of guns is occupying more and more attention in Germany, and with the abandonment of the 11-in. gun Messrs. Krupp seem to have ceased to make known the actual "life" of their guns, as in the endurance tables which were formerly given in the *Naval Annual*. These related to the surprising number of rounds fired on the trial ground by an 11-in. gun, from which it appeared that the built-up tube and jacket type made at Essen had a marked preponderance in this matter over the British 12-in. wire-wound gun. It appears to be stated in the German naval service that the new 12-in. has 30 per cent. less endurance than the 11-in., and the same feature must appear still more markedly in the larger types. Although the facts are wanting, it appears to be known that the life of the German 14-in. gun is equivalent to the firing of 80 or 90 rounds. Moreover, German guns are heavier calibre for calibre than British guns, and the re-tubing is not so easy as in the case of wire-wound guns. The

Krupp gun steel is undoubtedly of a quality not likely to be surpassed, but the problem of erosion is becoming of greater and greater importance with every increase in calibre and proportionate increase of gas pressure. In the *Naval Annual* last year details were given of the new 14-in., and some details are appended of the two later guns, which will also be found in the Krupp ordnance table:—

—		34·3 cm. = 13·56 in.			38 cm. = 14·96 in.		
Length, calibres		40	45	50	40	45	50
" bore	ft.	47	50·6	56·3	49·8	56·1	62·3
" total	"	47·9	53·5	59·1	53·1	59·3	65·6
Weight, light	tons	53·43	60·22	67·01	72·72	81·88	91·22
" heavy	"	59·24	66·71	74·40	80·50	90·73	101·15
" shell	lb.	1,212·5	1,212·5	1,212·5	1,653·4	1,653·4	1,653·4
" charge	"	388·0	445·2	507·0	526·8	604·0	690·0
Initial velocity	ft. sec.	2,779	2,940	3,094	2,772	2,936	3,091
Muzzle energy	ft. tons	64,604	72,718	80,532	88,250	98,874	109,498
Perforation steel at muzzle	ins.	40·94	44·39	47·71	45·56	49·53	53·30

It is improbable that the 15-in. gun will be mounted in any of the ships now building or contemplated. Possibly it is intended for coast defence works, for which the Krupps supply large numbers of guns. In the matter of ordnance for battleships the Germans have always been conservative, and they long retained the 11-in. when other navies had adopted a larger calibre. If a gun of 14 in., still more of 15-in., should be mounted in coming ships, it is not likely to be accepted with enthusiasm, and more probably will be regarded as having been imposed by the increasing armaments of other Powers. "Nauticus" says that the rumoured mounting of a 15-in. gun in British ships is wholly improbable.

On the subject of lighter guns there are various ideas, but "Nauticus" favours a mixed armament, and the plan is adopted in all the new ships. Fourteen 5·9-in. guns behind armour and twelve 3·4-in. are a powerful equipment. "Nauticus" says that the secondary calibre exercises a great moral and material effect, there being a large area of ships vulnerable to its attack, and that the 5·5-in. is the ideal gun for use against protected vessels. The smaller guns are regarded as indispensable for night defence against torpedo attack.

Armour. No light can be thrown upon progress in armour and steel production in Germany. Nothing authentic is known of the protection of any of the vessels built since the Dreadnought type was introduced, but the Helgolands are understood to have 12-in. water-line protection, reducing to 4 in. at the bow and stern, and

the bases of all the turrets are well protected. Transverse armoured bulkheads are general, and all the secondary guns are well protected in armoured barbettes.

Great attention is devoted to the subject of underwater protection in view of the danger of mines and the increased range of the torpedo, which is placing it alongside the gun as a means of attack in long-range engagements. "Nauticus" remarks that, unfortunately, just when the development of underwater protection was beginning to proceed upon systematic lines, secrecy began to be observed in all the great navies regarding these matters, and nowhere has the secrecy been more evident than in Germany. Consequently, says "Nauticus," just at the moment when underwater protection is increasing in interest we are placed in the disagreeable position of being dependent on information which is scanty and often unreliable. The Germans long held, and perhaps do still, to the practice of keeping the main bulkheads without doors, as the only safeguard against the possibility of doors being left open at the critical moment. In Germany theoretical considerations and tank experiments have been made by Dr. Bischel, Engineer Dr. Blochmann, and Naval Constructor Neubeck, but no great guidance has been obtained in this way. The French have experimented with armoured caissons representing the Henri IV. and Mirabeau, the Italians with the Morosini, and the Americans with the Florida and the Puritan, but the result of these and other trials is not definitely known. From the warm approval given to the French plan of building a longitudinal bulkhead over the greater part of the ship's length at some distance from the side, it may be inferred that this system has been adopted in Germany also. The great increase of beam which has become necessary in order to prevent increase of draught favours this system of protection.

Longitudinal bulkhead protection is not, however, directly concerned with armour protection. It is in many ways unfortunate that we cannot know what is being done in the matter of armour for German ships of war. Plates representing every class of armour are constantly under trial at the Krupp firing grounds, but no details are allowed to transpire.

Italy.

The object of the group of naval constructors, engineers and financiers who control or influence the productive activities of Italy in the matters of ordnance and armour is to make the country independent of foreign sources of supply. That they have not yet entirely succeeded is shown by the fact that the tender for 4100 tons of armour for the new ships was thrown open to international

competition, and that the contract was awarded to the Carnegie Steel Company at the price of £125 per ton. This is a matter which is referred to below. The combination consists chiefly of the Terni steel works—Alti Forni-Acciaierie di Terni—and the Vickers Terni ordnance factory at Spezia, with the shipbuilding and engineering establishments of the Orlando and Odero firms at Genoa. In association with the Armstrong gun-factory at Pozzuoli and other works it is hoped that it will be possible to build, arm and equip warships complete in every particular.

Armour. The initiative in the making of armour-plate in Italy came from Count Cavour, who in 1862 urged the national industries to utilise the excellent iron mines of the Valtrompia, but at the time the economic situation was not propitious, and it was not until Benedetto Brin took an energetic part in financial reconstruction that the Terni steel works were founded in 1884, the engineering chief being Signor V. S. Breda. Since that time the establishments have grown very greatly in resources and capacity. Power is obtained from the famous Cascata della Nera, but the company has also important lignite coal mines at Spoleto. Last year new armour-plate works were set in operation, as well as a new Martin steel plant, and at the meeting of the company in Rome, presided over by Signor Orlando, on March 26th, it was claimed that the plant in the new plate works was the most powerful in Europe, and that, in its utilisation of hydro-electric power and the excellence of its plant, it is on the highest level. The resources were stated to be of such an elastic character that the country could have all the armour-plate it would require, and the shipbuilding industry be placed in a position to undertake large work for foreign navies. The capacity for the production of Krupp armour-plating is returned as more than 12,000 tons per annum, as well as of the largest forgings for guns for the use of the Vickers-Terni factory.

In view of these great resources the award of the contract for a large quantity of armour-plating to the Carnegie Company seems remarkable, and is not easy to explain. The possible lack of productive capacity seems disposed of by the statement above. There can only remain the questions of time and price. It is pretty well known that there has not always been a proper co-ordination of means to ends in the development of the Italian Navy. Essential parts of ships, and perhaps more especially armour, have not always been ordered in due time to enable them to be supplied when they were required, with the result that delay has occurred in the completion of ships, and it has been suggested that such a situation of affairs may have caused a hasty appeal to be made to foreign resources. Whether this was really the case has not been disclosed.

With regard to the question of price, it is thought possible in Italy that the Carnegie Company may have chosen to secure the order at a very narrow margin of profit, and it has been asked whether this price is not less than is actually being paid by the United States Government for the armour for American ships. There has also been a rumour that the Italian Government desired to intimate its unwillingness to be dominated in the matter of price by anything in the nature of a "ring."

These are matters into which it is unnecessary to enter here, but there seems to be no doubt that by this time the steel resources are such that there need be no appeal to foreign resources for anything relating to armour, armament, or, indeed, for any other naval requirement. Krupp steel and other varieties of the metal are turned out in large quantities by the Terni establishments, which this year have entered upon a larger development. At the Turin Exhibition the company showed an armour-plate 13 ft. wide and nearly 50 ft. long, weighing about 24 tons, which had to be cut into sections for the purpose of railway transport, as well as a forged 12-in. gun tube over 50 ft. in length.

Vickers-Terni.

The Vickers-Terni ordnance works at Spezia are in the most intimate relations with the Terni steel works. As has been stated, the principal reason for which these magnificent works were erected was to complete in Italy the means of satisfying, in conjunction with the Armstrong works at Pozzuoli, the requirements of Government and private yards, in all that relates to gun and armament materials. The founders of the Vickers-Terni were Messrs. Orlando and Odero with the Acciaierie di Terni and the technical and financial aid of Messrs. Vickers. The Spezia works, however, are entirely Italian, and for the sake of safety have been built near the fortified Gulf of Spezia, in a position in a fold of the hills which cannot be attacked, and thus work can proceed even during time of war without any protection from the Navy.

The area of the works, excluding the ground put aside for a workmen's village, covers a space of 150,000 square mètres. The workshops are of the most up-to-date and perfected type, and the machinery is of the most modern kind. Travelling cranes capable of lifting 100 tons are placed in the workshops for the construction of big guns and barbettes, for which four huge pits, 40 ft. in diameter and 60 ft. deep, have been prepared, for the completion, adaptation and test of naval mountings.

The workshop for the building up of the big guns is said to be the largest in Europe. It is equipped with an electric travelling crane capable of lifting 100 tons, which works at a height of nearly 100 ft. from the ground, with a pit 60 ft. deep, so that it is

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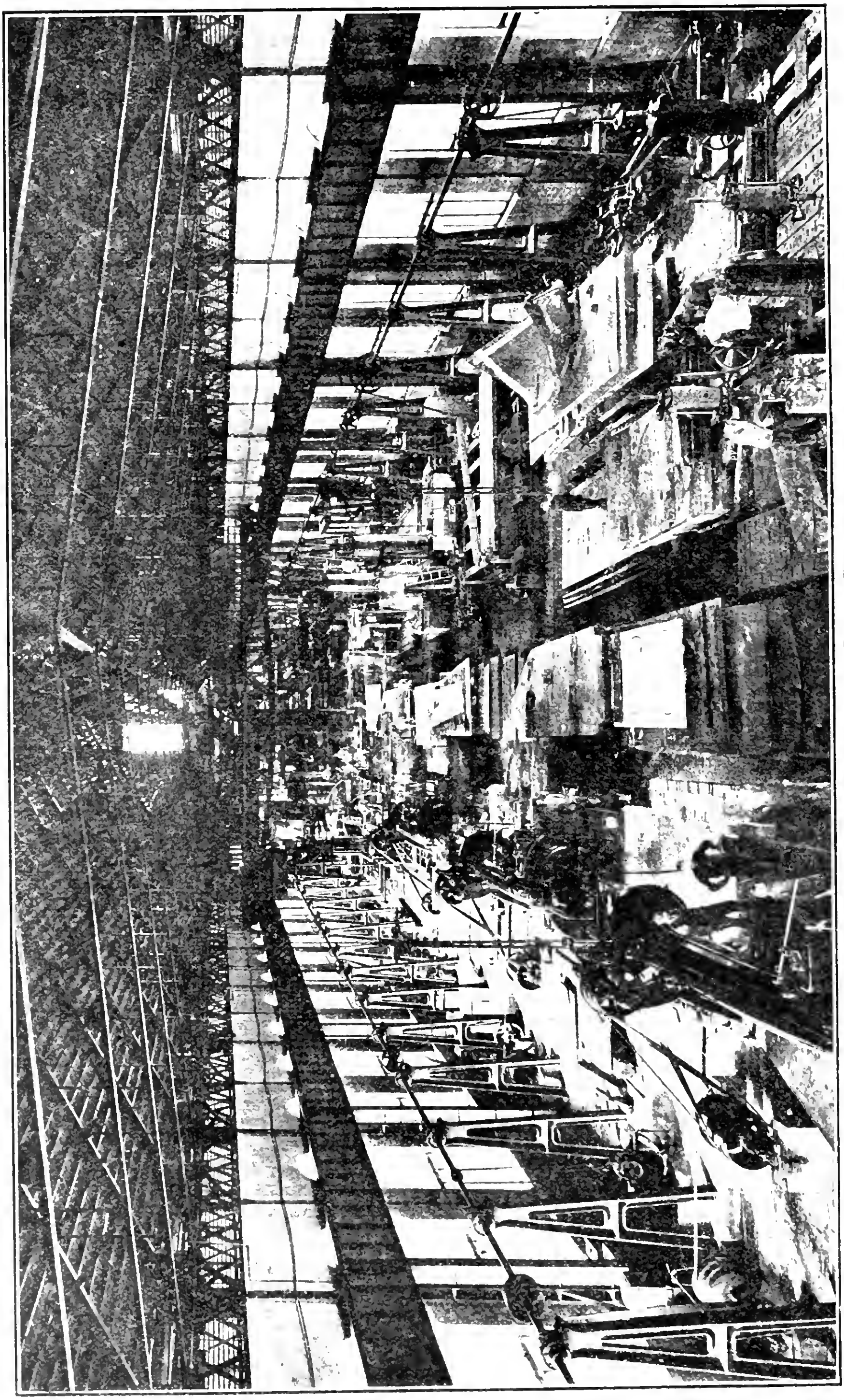
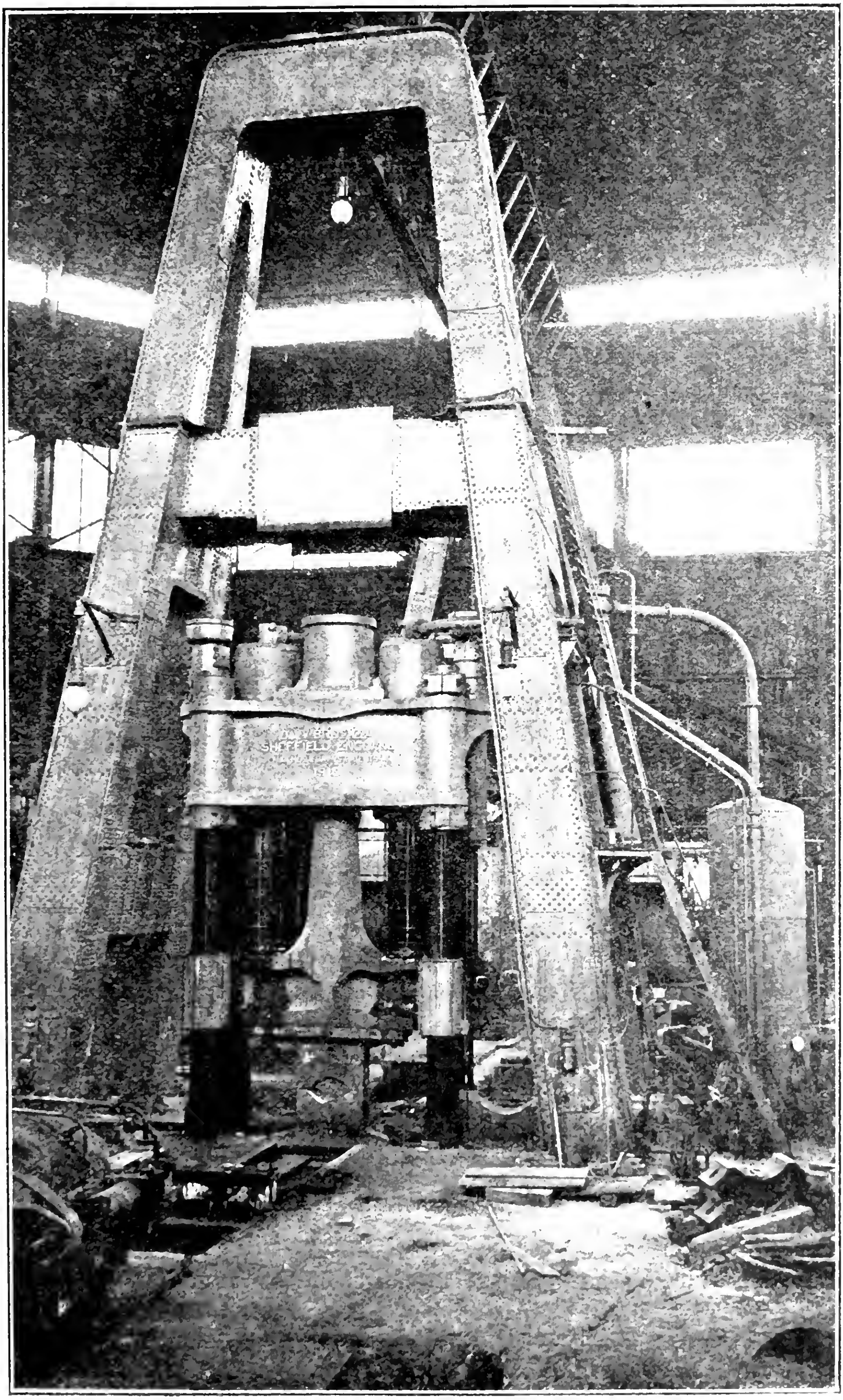


VICKERS TERNI ARMOUR-PLATE SHOP.



Vickers-Terst 6000-Ton Press

possible to construct guns even larger than 16 in. and of 50 calibres of length, all the machine tools being on this scale.

The strength of Vickers-Terni lies in its alliance with the Terni steel works, which have undertaken to furnish all forgings and pieces of cast-steel required for the construction of the guns and mountings. Thus co-ordinating work according to modern methods, the Vickers-Terni ordnance establishments have not required to have their own steel works, for which, however, a space on their ground had been set aside. The works at Terni have been fitted with great hydraulic presses, plant for tempering and treating the material, and large lathes for the work on the tubes and jackets for the bigger guns.

The association of these two firms constitutes such a powerful and complete organisation that it may certainly be anticipated that it will be possible in Italy, between the works at Pozzuoli and those at Spezia, to turn out the best type of guns, like those of the firms of Armstrong and Vickers.

The Spezia works are also fitted with the plant for making field and siege artillery, and are now executing important orders for the Army, besides the armament of the new Italian Dreadnoughts. When the King of Italy recently paid a visit of inspection to the works, His Majesty expressed his high satisfaction at the manner in which these great works had been built and supplied with plant within a very short space of time.

Erosion.

Hand in hand with the production of guns, there is visible in Italy an increasing anxiety with reference to the "life" of these weapons, and the possibility of reducing the erosive effects which are the enemy of that "life." An important study of this question, from the pen of Captain Bravetta, recently appeared in the *Rivista di Artiglieria e Genio*, and seemed to embody the conclusions at which Italian authorities on ordnance have arrived. Some chemical experts have regarded it as an error to strive for high calorific effects with low pressures, and have urged that the true object should be to attain great results with low temperatures. Captain Bravetta says there may be two ways of reducing temperature. There may be the possibility of introducing some substance which will operate as a refrigerator, or there may be a reduction in the proportion of nitro-glycerine. He considers that these may be practical methods, while the abandonment of the nitro-glycerine compound seems, at least at present, impracticable. There would be too many difficulties in adopting a nitro-ammonium compound. If it were possible to arrive at a less erosive material of that kind, insensible to humidity, which seems unattainable, it would be necessary to go to a pressure of 3500 to 4000 atmospheres, which

would be equivalent to ordering the provision of new ordnance altogether. Carbon, or substances rich in carbon, such as dense vaseline, will render powder less sensible to heat and make it more stable; but there is the disadvantage that such powders are apt to produce return flames, which may be the cause of disaster. It has therefore been proposed to introduce some substance rich in oxygen, such as nitrate of barium, in the proportion of 10 per cent. of the total weight; but the effect is to increase the production of smoke, to add to the weight of the charge, and to leave residual products in the tube, besides other undesirable consequences. It has been proposed also to vary proportions and introduce other substances with the object of removing these defects, but apparently without great results. Dinitro-glycerine, besides being less sensitive to shocks, may have over nitro-glycerine the advantage of being more stable, producing little smoke, and having somewhat smaller erosive effects. It may be a *quid medium* between nitro-glycerine and nitro-cellulose.

But Captain Bravetta is of opinion that gelatinized nitro-cellulose, excluding nitro-glycerine, though theoretically less erosive, has in practice given unsatisfactory results. He points out other disadvantages, and says that powders with a nitro-cellulose base are very unstable, and must be kept in hermetically-sealed cases if they are to retain the volatile elements which give them their ballistic value. Captain Bravetta does not therefore give to the Italian naval service much hope of prolonging the "life" of the guns, especially those of large calibre, which have a constitutional defect that begins to reveal itself from the very first round fired, and condemns the gun to ultimate failure unless re-tubed. The best policy, therefore, he says, is to have a large reserve of guns, and to establish the best system of keeping them efficient by providing resources for rapid re-tubing or otherwise making good the ravages of the erosive propellents. In short, the remedy, in his view—which, there is reason to believe, is that of the Italian Navy—the remedy is not chemical but mechanical.

He has shown the gravity of the situation by giving tables which prove that the 45-calibre 12-in., firing one round a minute, which is a minimum, perhaps, in a hot action, and having a "life" of 100 rounds, will be useless after an hour and forty minutes, while the 50-calibre gun will be exhausted after one hour and twenty-six minutes, its "life" being reckoned as equal to 86 rounds. As to the 13·5-in., with a "life" of 80 rounds, and firing at intervals of eighty seconds, it would last one hour and forty-seven minutes. He pursues this method of calculation into the larger calibres, which are not yet afloat, and does not give an encouraging picture of the vitality of these weapons in a hard-fought engagement.

BRITISH RIFLED ORDNANCE.

Other guns are mounted, but details are withheld from publication.

Ordnance.										Charge (cordite).		Projectile.						Ballistics (with full charges).					
Nature.					Chamber.		Rifling.												Perforation of wrought iron.				
							Twist one turn in.																
Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter (at largest).	Length to base of projectile.	Least at breech.	Greatest at muzzle.	System.†	Weight.	Size.	Diameter.	Weight.	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^3}$.	Muzzle velocity.	Total muzzle energy.	At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards.	Perforation Krupp steel, 3000 yards. Uncapped Shot.
B.L. GUNS.				cals.	ins.	ins.	cals.	cals.		lbs. oz.		ins.	lbs.	lbs. oz.			f. s.	ft. tons.	ins.	ins.	ins.	ins.	ins.
16·25-in.	110½ tons.	III.	524·0	30·0	21·125	84·5	newer patterns.	30	Modified Pl. Section, the last in the new guns.	960‡ S.B.C.	..	16·25	1800	‡‡193 **179¼	0·147	0·420	2087	54,390	38·0	34·6	31·7	29·4	13
13·5-in.	69 & 67 tons.	I. II. III.& IV.	433·0	30·0	18·0	66·5		30		187 8	..	13·5	1250	**85	0·146	0·508	2016	35,230	33·0	30·2	27·6	25·2	11
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0		30		167 8	50	12·0	850	80–1$\frac{9}{11}$	0·169	0·492	2367	33,020	37·0	32·7	29·4	26·6	11½
12-in.	50 tons.	IX. Wire	496·5	40·0	17·5	87·2		..		201 8 / 9 8	50 / 3¾	12·0	850	”	..	..	2481 / §2580	36,290 / 39,280	39·7 / 42·0	35·4 / 38·0	31·6 / 34·6	28·7 / 32·0	12½ / 14
12-in.	58 tons.	X. Wire	558·0	45·0	..	..		..		325 0 M.D.	..	12·0	850	..	..	..	2900	47,697	51·0	46·2	42·0	38·4	17
10-in.	31 tons.	Triumph & Swiftsure	483·0	45·0	14·0	64·5		..		..	..	10·0	500	..	..	..	§2800	§27,205	39·5	34·6	30·2	27·0	11¾
10-in.	29 tons.	II. III. III.ᴬ & IV.	342·4	32·0	14·0	54·0		30		76 0	30	10·0	500	37¾	0·200	0·500	2040	14,430	24·8	21·8	19·3	17·0	7½
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0		35		42 0	30	9·2	380	18 ‡‡33 **30$\frac{6}{16}$	0·223	0·488	1781	8,356	18·3	15·9	14·4	12·4	5½
9·2-in.	24 & 22 tons.	III. V. VI. VI.ᴬ&ᶜ & VII.	310·0	31·5	12·0	43·0		30		53 8	30	9·2	380		0·223	0·488	2065	10,910	22·9	19·8	17·2	15·5	6¾
9·2-in.	25 tons.	Wire VIII.	384·0	40·08	10·5	53·15		..		63 0	40	9·2	380	..	0·223	0·488	2347	14,520	27·6	23·9	20·7	18·0	7¾

9·2-in.††	28 tons.	Wire X.	442·35	46 6	13·0	71·215	Various in the	..	P. Elswick, Hook, or	103	0	44	9·2	380	..	0·223	0·488	2640 §2800	18,400 20,685	33·3 36·0	28·9 31·2	25·0 27·4	22·0 21·0	9½ 10½
7·5-in.	16 tons.	Triumph & Swiftsure	386·7	50·0	..	46		..		..		..	..	200	..	0·281	0·474	§2800	10,883	29·0	24·9	21·4	17·8	7¾
7·5-in.	14 tons.	..	337·5	45	11·1	55		30		47 2	0 8	30 2½	7·5	200	18½	0·281	0·474	2600	9,340	26·0	22·3	18·8	15·7	6¾
6-in.	5 tons.	III.	170·7	25·53	8·0	26·75		35					6·0											
6 in.	5 tons.	IV. VI.	173·5	26·0	8·0	26·75		35 30		14	12	20	6 0	100	$7\frac{4}{16}$ $**9\frac{13}{16}$	0·360	0·463	1960	2,665	13·4	10·7	8·9	7·0	3
6-in.	7·4 tons.	VII. VIII.	269·5	45	8·5	32·7		30		20	0	20	6·0	100	9	0·360	0·463	2193 §2750	4,308 5,250	19·6 22·3	15·3 18·0	11·9 14·6	9·8 11·6	4¼ 5
4-in.	23 cwt. 26 cwt.	II.II$_p$.III.III$_A$ IV.V.& VI.	120·0	27·0	5·3	18·5	120	30		3	1	5	4·0	25	$1\frac{12}{16}$ $3\frac{3}{16}$	0·640	0·391	1900	625	7·7	5·4	4·0	3·0	..

* The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c. Some details of the 12-in. Mark X. uncertain.
† P. means Polygroove; Pl., Plain; ‡ Cordite has not been introduced for this gun; § Estimated with M.D. cordite;
** Cast steel; †† A 50-calibre 9·2-in. gun is under construction; ‡‡ Forged steel.

BRITISH RIFLED ORDNANCE—*continued.*

Ordnance: Nature: Calibre or Pr.	Ordnance: Nature: Weight.	Ordnance: Nature: Mark and Service.	Ordnance: Total length in inches.	Ordnance: Length of Bore, including Chamber.	Ordnance: Chamber: Diameter.	Ordnance: Chamber: Length to base of projectile.	Ordnance: Rifling: Twist one turn in: Least at breech.	Ordnance: Rifling: Twist one turn in: Greatest at muzzle.	Ordnance: Rifling: System.*	Charge (full): Weight.	Charge (cordite): Weight.	Charge (cordite): Size.	Projectile: Diameter.	Projectile: Weight.	Projectile: Bursting Charge of Common Shell.	Projectile: Value of $\frac{d^2}{w}$.	Projectile: Value of $\frac{w}{d^3}$.	Projectile: Muzzle velocity.	Ballistics: Total muzzle energy.	Ballistics: Muzzle energy per ton of gun.	Ballistics: Perforation of wrought iron: At muzzle.	Ballistics: Perforation: At 1000 yards range.	Ballistics: Perforation: At 2000 yards range.	Ballistics: Perforation: At 3000 yards range.
				cals.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.	ins.
QUICK-FIRING GUNS (using metal cases)																								
6·0 in.	7 tons	I. & III. II. (Wire)	249·25	40	..	..	60	30	P.	..	13 4	30	6·0	100·0	..	0·360	0·463	2200	3356	479	15·9	12·7	10·2	8·2
6·0 in. Q.F.C.	5 „	I. to VI.	169·1 166·6	26·2 26·6	.. ..	.. ..	.. ..	.. ..										1913	2537	362	13·0	10·3	8·2	6·4
4·7 in.	41 cwt. 42 „	I. II. III. & IV. Wire	194·1	40	..	..	100 0	34·4 30	E.O.C.	..	5 7	20	4·72	45·0	..	0·495	0·428	2188	1494	711	12·4	9·2	6·6	5·0
4 in.	26 cwt.	I. II. III. Wire converted guns	165·25 120	40 28	..	..	..	30	M.Pl.	..	3 9	15	..	25·0	..	0·640	0·390	2300 2177	917 821	705 569	10·5 9·5	6·9 6·5	4·9 4·6	3·3 3·0
12-pr.	12 cwt.	I.	123·6	40	..	..	120 0	28 30	E.O.C. M.Pl.	..	1 15	10	3·0	12·5	..	0·072	0·463	2210	423	677	8·1	5·3	3·5	2·4
12-pr.	8 cwt.	I.	87·6	28	..	..	60 0	28 30	E.O.C. M.Pl.	..	13¾	10	3·0	12·5	..	0·072	0·463	1607	223·8	544	4·9	3·2	2·4	..
Hotchkiss . 6-pr...	8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	M.Pl.	..	b7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	4·8	2·8	..	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..																		
Hotchkiss . 3-pr...	5 cwt.	I. & II.	80·63	40	..	..	25	25	M.Pl.	..	b6⅜	5	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	4·1	2·1	..	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4									..	..	..	..	..	1920	84·3	337·2	4·3	2·2	..	..
MACHINE GUNS.										grains.				grs.										
Maxim, 1 bar 0·45 in.	63 lbs.	I.	45·0	..	..	..	10	27	Enfi'ld	31 Cordite	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as M.H. Rifle.			
Maxim, ·303			42·38				10	25·6	Metf'd				0·303	215	..	..	..	..	..	..	Same as Lee-Metford.			

* P. means Polygroove; M.Pl., Modified plain.

b With 4 grs. R.F.G.

Note.—An armour-piercing shell has now come in for the 6-in. guns.

AUSTRIAN NAVAL ORDNANCE.

Designation by Calibre, in centimètres, length in calibres, and type of gun	30·5 L. 45 Skoda.	24 L. 45 Skoda.	24 L. 40 Skoda.	24 L. 40 K. 01	24 L. 40 K. 94	19 L. 42 Skoda.	15 L. 40 Skoda.	15 L. 40 Krupp	15 L. 35 K. 80	12 L. 40 Skoda.	12 L. 35 K. 87
Calibre, in inches	12·01	9·45	9·45	9·45	9·45	7·5	5·91	5·9	5·87	4·72	4·72
Length: Total, in feet	45·0	33·0	31·5	31·6	31·4	26·3	19·5	19·5	17·13	15·74	13·8
Length: Rifled Portion, in ins.	417·9	325·8	290·3	291·3	286·2	239·7	182·6	182·5	153·6	147·6	126·3
Length: Powder Chamber in ins.	68·3	58·1	55·5	59·0	63·7	51·8	35·4	35·4	35·4	28·3	26·3
Length: Of bore in calibres	45	45	40	40	40	42	40	40	35	40	35
No. of Grooves	92	72	72	72	72	56	44	44	36	36	36
Twist in calibres	40–25	40–25	45–25	..	..	..	..	..	25	25	25
Weight: Gun, tons	51–9	25·78	27·55	21·5	27·8	11·6	5·18	4·42	4·69	1·97	2·31
Weight: Breech Block, in lbs.	3450·2	1873·9	1336·0	..	..	..	..	339·5	463·0	..	211·6
Weight: Steel Shell ,,	992	473·0	504·8	474	474	198	112·5	100·3	86·0	52·4	57·3
Weight: Common Shell ,,	..	..	..	474	474	..	112·5	..	69·9	52·4	57·3
Weight: Shrapnel Shell ,,	..	..	..	..	..	..	..	..	71·9	..	57·3
Weight: Case Shot ,,	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge: Steel Shell ,,	..	..	4·5	..	..	..	..	1·98	1·76	..	0·55
Weight of Bursting Charge: Common Shell ,,	..	..	35·4	..	..	..	..	5·73	3·86	..	2·2
Weight of Bursting Charge: Shrapnel Shell ,,	..	..	..	..	..	..	..	0·96	1·10	..	0·57
Weight of Firing Charge: Steel Projectile, in lbs.	..	147·7	99·2	120·6	91·5	56	28·8	18·29	38·8	9·7	12·13
Weight of Firing Charge: Common Shell, in lbs.	..	..	66·1		91·5			..	38·8	..	12·13
Weight of Firing Charge: Shrapnel, in lbs.	..	..	..	..	..	..	..	..	..	..	..
Muzzle Velocity, in feet	2625	2625	2313	2595	2264	2700	2608	2263	1969	2264	2133
Muzzle Energy: Total, foot-tons	47,402	18,799	18,244	22,121	16,845	10,025	5308	3351	2312	3554	1808
Muzzle Energy: Per inch circumference, foot-tons	..	..	..	..	..	..	..	..	125·4	..	122·2
Thickness of Iron, perforated inches at Muzzle, by Tresidder's formula	..	..	...	34·5	29·0	27·3	22·0	..	12·6	13·7	12·9
Perforation of Krupp Steel, 3000 yds., inches	..	..	..	9½	8	6¾	5	..	..	..	..

There are other types of Krupp guns, also Skoda 7-cm., Skoda and Hotchkiss 47-mm., and Hotchkiss 37-mm.

Corrected to March, 1911.

DANISH NAVAL ORDNANCE.

Designation by Calibre, in centimètres, length in calibres, and type of gun	26 L. 35 Krupp	24 L. 40 1893 Krupp.	24 L. 40 1896 Canet.	24 L. 43 1901 Bofors.	24 L. 43 1906 Bofors.	21 L. 35 Krupp.	15 L. 35 1888 Krupp.	15 L. 43 1896 Bofors.	15 L. 43 1901 Bofors.	15 L. 50 Bofors.	12 L. 40 Krupp.	8·7 L. 40 Krupp.	7·5 L. 55 Danish semi-aut.	5·7 L. 44 Hotch-kiss.	4·7 L. 44. Hotch-kiss.	4·7 L. 50 Danish semi-aut.
Calibre, in inches	10·24	9·45	9·45	9·45	9·45	8·24	5·87	5·87	5·87	5·87	4·72	3·43	2·95	2·24	1·85	1·85
Total length, in feet	29·86	31·50	31·50	33·86	33·86	24·05	17·12	21·17	21·17	24·46	15·75	11·41	13·53	8·13	6·72	7·71
Length of Bore, including Powder Chamber: in inches	327·6	349·7	358·5	397·0	397·0	264·5	189·0	244·0	247·4	286·4	176·4	126·8	152·6	89·8	74·1	87·6
Length of Bore, including Powder Chamber: in calibres	32·0	37·0	37·9	42·0	42·0	32·1	32·2	41·6	42·1	48·8	37·3	37·0	51·7	40·0	40·0	47·3
Number of Grooves	60	72	60	60	60	48	36	44	44	44	36	32	28	24	20	20
Twist of Rifling, in calibres	70–25	00–25	72–33	72–33	33	50–25	70–25	70–30	70–30	30	42–25	45–20	30	180–30	25	40–25
Total weight, including Breech-gear, tons	27·3	25·4	22·9	24·3	24·5	13·3	4·7	5·5	5·5	7·5	2·26	1·13	0·87	0·36	0·23	0·32
Weight of Breech Block, tons	2006	1691	871	851	802	904	390	295	252	313	205	136	83	60	40	40
Weight of Armour-piercing Projectile, lbs.	452	353	353	353	353	238	112	112	112	112	..	..	..	..	..	..
Weight of " Shell "	..	353	353	353	353	..	..	112	112	112	44	20	15	6	3·3	3·3
Weight of Common Shell, lbs.	452	353	353	353	353	238	112	112	112	112	44	20	15	6	3·3	3·3
Weight of Bursting Charge: Armour-piercing Shell, lbs.	..	5·3	5·3	5·3	5·3	..	..	1·7	1·7	1·7	1·7	0·7	0·7	0·25	0·11	0·11
Weight of Bursting Charge: Common Shell, lbs.	29·8	24·9	24·9	21·4	21·4	16·5	7·2	7·2	7·2	7·2	2·8	1·3	0·7	0·19	0·14	0·14
Weight of Firing Charge, lbs.	191·8	91·5	77·2	83·8	97·0	105·8	41·9	22·0	22·5	34·2	11·3	4·7	4·0	1·3	1·1	1·4
Muzzle Velocity, feet	2018	2362	2362	2477	2641	2018	1854	2297	2297	2690	2362	2362	2625	2297	2346	2723
Muzzle Energy: Total foot-tons	12750	13640	13640	15000	17060	6712	2678	4100	4100	5642	1702	767	737	218	126	170
Muzzle Energy: Per inch circumference, foot-tons	396·4	459·5	459·5	505·4	574·7	259·3	145·2	222·4	222·4	306·1	114·8	71·2	79·5	31·0	21·7	29·3
Perforation at Muzzle, wrought iron, Tresidder's formula, inches	22·8	26·6	26·6	28·6	31·5	18·5	13·2	18·3	18·3	23·2	13·3	10·5	11·7	6·8	5·8	7·2
Perforation Krupp Steel, 3000 yards, inches	6·2	9·1	9·1	9·8	10·7	4·2	3·3	6·2	6·2	7·9	..	..	..	..	..	..

There are also some older 1·46-inch 1-pr. Hotchkiss guns.

Corrected to February, 1910.

DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading Q.F.											
Designation by Calibre, in centimètres	28 Q.F.	28	28	24 Q.F.	24 Q.F.	21	21	15 Q.F.	15 Q.F.	15 Q.F.	15 Q.F.	12 Q.F.
Calibre, in inches	11·0	11·0	11·0	9·4	9·4	8·2	8·2	5·9	5·9	5·9	5·9	4·72
Total Length, in feet	40·0	20·0	27·56	31·5	31·5	24·06	24·06	17·12	19·55	19·55	19·55	15·75
Length of Rifled Portion of Bore, in inches	..	170·34	244·55	..	..	222·75	212·32	..	..	..	..	..
Length of Powder Chamber "	..	35·43	42·71	..	..	30·90	41·34	..	..	..	..	..
Length of Bore, in Calibres	40	18·79	27·00	37	37	32·11	32·11	32	37	37	37	37
Number of Grooves	..	64	64	..	..	48	64	..	..	..	..	..
Depth of Grooves, inches	..	0·04	0·04	..	..	0·4	0·4	..	..	..	..	..
Twist of Rifling, in Calibres	..	45	70–25	..	..	45–25	45–25	..	..	..	..	2·35
Total Weight, in tons	29·53	27·2	27·06	24·1	24·39	13·28	13·96	3·83	4·33	4·78	5·11	..
Firing Charge { Armour-piercing Projectile, in lbs.	..	132·3	185·2	..	..	94·8	119	..	..	..	..	..
Firing Charge { Common Shell "			154·3									
Weight { Armour-piercing Projectile "		537·76	760·60									
Weight { Common Shell "	595·24	476·18	476·18	374·80	374·80	308·64	308·64	100	100	90·38	90·38	52·35
Weight { Case Shot "		..	..									
Bursting Charge { Armour-piercing Projectile "	..	..	..	..	..	..	..	..	..	..	..	..
Bursting Charge { Common Shell "												
Muzzle Velocity, feet	2920	1558·5 1673	1591 1706	2690·5	2789	1798	1903	2133	2221	2444	2789	2221
Muzzle Energy { Total, in foot-tons	15,191	9425	13,315	18,809	20,210	6920	7750	3169	3469	3744	4874	1807
Muzzle Energy { Per inch Circumference, foot-tons	..	..	..	..	..	..	..	..	..	..	..	..
Perforation at Muzzle, in inches (Krupp Steel)	24·25	..	11	18·1	19·1	8·25	9	6·1	6·5	9·8	11·5	4·7
Perforation Krupp Steel, 3000 yards	18·50	..	8·25	14	14·2	5·7	6·3	3·5	3·9	5·7	7·1	..

Corrected to February, 1910.

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1902.	Model 1893–96.				Model 1893.					Model 1887.				1884.					1881.						
Desig. by Calibre, in cms.	30·5	30·5	27·44	24·0	19·4	34·0*	30·5	27·44	24·0	19·4	34	30·5	27	19	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14
Calibre, in inches . .	12·01	12·01	10·8	9·45	7·64	13·39	12·0	10·8	9·45	7·64	13·39	12·0	10·80	7·64	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46
Total length, in feet .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3
Length of Bore, in ins. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	380·6	280·2	306·9	269·3	180·9	180·9	162·6
Length of Bore, in cals.	45	40	40	45	45	35	40	40	40	40	42	45	45	45	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28
Number of Grooves .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035
Rifling Twist . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°
Total weight, in tons .	..	44·4	34·5	23·6	12·5	52·9	45·9	34·9	22·4	10·6	60·0	49·2	37·1	10·6	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2
Weight of Firing Charge — Armour-piercing Projectile, lbs. . . .	..	246	188·5	145½	74	243·0	198·4	114·6	110·2	44·1	220·5	198·4	114·6	44·1	388·0	200·6	..	42·5	..	388·0	337·3	203·9	149·9	42·5	32·6	..
Weight of Firing Charge — Com. Shell lbs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1
Weight — Armour-piercing Projectile lbs.	750	750	562	375	190	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..
Weight — Com. Shell „	..	750	562	375	190	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1
Muzzle Velocity, in f.-s., A.P. Projectile . .	2870	2650	2650	2870	2870	2400	2625	2625	2625	2625	2560	2625	2625	2625	1969	1969	1969	1969	1969	1969	1804	1969	1969	1969	1821	1936
Muzzle Energy — Total, in f.-t. .	42890	36782	27186	21445	10890	36850	30750	22750	15170	7898	42040	30750	22750	7898	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..
Muzzle Energy — Per in. circ., f.-t.	..	..	..	..	..	..	815·8	670·7	511·1	329·1	..	815·8	670·7	329·1	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·3	..
Perforation at Muzzle† wrought iron, inches.	46·0	42·7	38·8	37·0	29·0	36·8	37·3	33·7	29·4	23·4	40·8	37·3	33·7	23·4	27·6	22·0	19·2	13·0	10·7	27·6	24·2	22·0	19·2	13·0	11·6	..
Perforation Krupp Steel 3,000 yds.	15½	13½	11½	10½	6¾	11½	11	9	7½	5½	13	11	9	5½	7½	6	5¼	3	..	7½	7	6	5¼	3	..	..

* For special purposes. † By Tresidder's formula.

A new type of the 1902 Model has been tried with 7·6-in. and 6·4-in. calibre. These will probably be replaced by model of 1906, 12-in. 970 lb. projectile, velocity 2840 f.-s., and 9·4-in. 220 lb. projectile, velocity 2840 f.-s.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.		16·47.*	Q.F. Guns. Mod. 93 6. 16·47	16§	16‡	14§	14‡	Mod. 92. 10	Mod. 91. 10	Mod. 81. 10‡
Desig. by Calibre, in cms.		16·47		16·47		13·86			10·00	
Calibre, in inches		6·46		6·46		5·44			3·94	
Total length, in feet		26·9								
Length of Bore, in inches		..								
Length of Bore, in calibres		47·5	45	45	30	45	30	55	45	26
Number of Grooves		..								
Depth of Grooves, inches		..								
Rifling Twist		..								
Total weight, in tons		8·5	8·1	6·89	4·92	4·13	3·84	2·19	1·62	1·18
Weight of Firing Charge: Armour-piercing Projectile	lbs.	..	44	30·2	19·0	16·1	12·8	8·16	8·16	5·07
Weight of Firing Charge: Common Shell	,,	..								
Weight: Armour-piercing Projectile	lbs.	115	115	99·21		66·14			30·87	
Weight: Common Shell	,,	..	115	99·21		66·14			30·87	
Muzzle Velocity, in ft.-secs.		3110	2870	§2625	2100	2625	2100	2500	2428	1840
Muzzle Energy: Total, in foot-tons		7185	6568	4730	3061	3160	2022	1340	1266	725
Muzzle Energy: Per in. circ. foot-tons		..	..	233·5	150·9	184·9	118·7	..	..	..
Perforation at Muzzle, wrought iron, inches		26·3	24·5†	20·0†	14·4†	17·7†	12·7†	13·0†	12·5†	8·2†
Perforation Krupp steel, 3,000 yards		5¾	5¼	4	..	..	..	..	..	..

* Experimental gun not in service. † By Tresidder's formula. ‡ Models 1881 and 1884 converted guns.
§ There are three models of the years 1887, 1891 and 1893, of slightly different weights from the above.

ITALIAN NAVAL ORDNANCE.

		Armstrong Breech Loading.					Q.F.	Armstrong B.L.	Armstrong Quick-Firing.					
Designation by Calibre, in centimètres		43·1†	43·1† Early Pattern. 1882.	34·3	30·5	25·4	20·3	15·2	15·2	15·2	15·2	12·0	12·0	7·6
Calibre, in inches		17	17	13·5	12	10	8	6	6	6	6	4·7	4·7	3·0
Length	Total, in feet	40·75	39	36·09	..	34·8	..	16·9	17·0	20·9	20·9	16·2	13·0	..
	Rifled Bore, in inches	346·8	315·7	..	..	..	..	..	..	..	..	189 (Rifled Bore and Powder Chamber)	..	..
	Powder Chamber, in inches	84·5	98	..	..	..	..	..	..	..	..		..	..
	Bore, in Calibres	27	26	..	40	40	45	32	33·0	40	40	40	35	40
No. of Grooves		82	82	56	..	..	..	..	..	..	..	22	22	..
Twist of Rifling, in Calibres		50	50	..	..	..	..	..	..	..	..	34·4	..	..
Total Weight, in tons		104·3	101·5	67·9	..	30	..	5·4	5·1	5·7	6·5	2·05	1·69	0·6
Firing Charge	Armour-piercing projectile, lbs.	900·0	725	630·5	..	..	..	46	46	46	17·6*	..	..	..
	Common Shell, ,,	600	480	..	..	..	..	..	..	..	..	..	..	..
Weight	Armour-piercing projectile, ,,	2000	2000	1250	850	448	250	98	98	100	100	45·0	36·0	12
	Common Shell, ,,	2000	2000	1250	..	..	..	..	..	..	..	..	36·2	..
	Shrapnel ,, ,,	2017	2017	1250	..	..	..	..	..	..	..	..	29·8	..
	Case Shot ,,	..	..	..	..	..	..	..	..	..	..	..	..	..
Bursting Charge	Armour-piercing projectile, ,,	32	32	17·4	..	..	..	2·0	2·0	5·1	4·4	..	1·83	..
	Common Shell, ,,	60	60	87·1	..	..	..	..	..	..	..	..	3·02	..
	Shrapnel ,, ,,	5	5	4·25	..	..	..	..	..	..	..	..	0·35	..
Muzzle Velocity, in ft.-secs.		1992	1935	2016	2500	2460	2600	1952	1985	2149	2297	2180	..	2625
Muzzle Energy	Total, foot-tons	55,030	51,930	35,230	36,925	18,798	11,730	2577	2705	3169	3622	1490	..	573
	Per inch circumference, foot-tons	1035	976·3	830·8	..	..	..	..	..	..	..	..	..	..
Perforation at Muzzle, inches of iron by Tresidder's formula		36·7	35·0	33·0	40·0	31·0	28·3	13·2	13·6	15·4	17·0	12·4	..	10·2
Perforation Krupp Steel, 3000 yds., inches		12½	12	11	13	9	7	..	..	..	3½	..	..	..

* Ballistite. † There are four types of these guns, viz.—Lauria, Lepanto, Italia, Morosini.

Note.—There is also a 6-inch quick-firing gun, 40 cals. M.V., 2600 f.s.

The weight of Ballistite charges is not known, but it is understood that they give the same ballistics as the powder charges shown.

Corrected to April, 1910.

NAVAL ORDNANCE OF NORWAY.

	Modern Guns.							
Designation by Calibre, in cms.	21	21 Q.F.	15	15 Q.F.	12 Q.F.	76 mm.	76 mm.	7 cm.
Calibre, inches	8·24	8·24	5·87	5·87	4·7	3·0	3·0	2·8
Total Length, feet	24·0	31·2	19·6	23·3	17·7	10·3	13·3	9·2
Length: Rifled Portion of Bore, inches	212·3	309·7	178·0	234·1	179·2	102·4	127·7	81·8
Length: Chamber, inches	49·0	48·6	39·0	32·9	26·0	15·4	20·4	19·1
Length: Bore in calibres	35·0	43·8	37·2	45·8	44·0	40	50	36·6
Number of Grooves	64	32	44	28	26	16	28	28
Twist of Rifling	46–23	∝–30	45–25	∝–30	∝–30	∝–30	30	20
Total Weight, tons	14·2	18·9	5·6	7·1	2·7	0·6	1·0	0·63
Weight of: Armour-piercing Shell, in lbs.	309	309	112·4	99·3	45	12·5	12·5	10·5
Weight of: Common Shell, in lbs.	..	..	..	..	..	..	..	..
Weight of* Firing Charge: Armour-piercing Shell, in lbs.	45·6	54	20·4	20·9	9·4	2·2	3·75	2·2
Weight of* Firing Charge: Common Shell, in lbs.	..	..	..	..	..	..	..	..
Muzzle Velocity, feet	1903	2300	2050	2625	2570	2200	2840	2230
Muzzle Energy, Total foot-tons	7760	11450	3328	4870	2060	430	695	367
Perforation through Iron by Tresidder's formula	19·3	25·6	15·4	21	15·3	8·0	11·6	7·8
Perforation, Krupp Steel, 3000 yards	4¾	6½	3¼	4	..	..	..	..

* Smokeless powder.

Corrected to February, 1910.

RUSSIAN NAVAL ORDNANCE.

	Heavy Guns.			Q.F. Guns.		
Calibre, in inches	12	10	8	6	4·7	12-pdr.
Weight, in tons	59	32	..	..	..	..
Length, in calibres	40	45	45	45	45	50
Weight of Projectile, in lbs.	720	488	188	89	46	12
Muzzle Velocity, foot-seconds	2600	2550	2950	2600	2700	2700
Perforation, in inches, of Wrought Iron — At Muzzle	38	35	27	22½	15½	10·2
Perforation, in inches, of Wrought Iron — At 2000 yards	30	27	20	13	9	4·8
Perforation of Krupp Steel at 3000 yards	12	10½	6½	4¾	..	..

There exists a new pattern 12-in. gun of 50 calibres, but details are not published.

Corrected to February, 1910.

SPANISH NAVAL ORDNANCE.

—	Hontoria.—Pattern 83.—Breech Loading.						Canet.		Skoda.			Krupp.	Vickers.		Maxim Nordenfelt.	Nordenfelt.		Sarmiento (*)	Hotchkiss.			Maxim Nordenfelt.
Designation by Calibre, in m/m	320	280	240	200	140	120	150	140	150	70	47	105	101·6	75	75	57	42	42	57	37	37	37
Length { Total length, in m/m	11780	10310	10200	7360	5303	4420	7500	6300	5960	2713	2018	3680	5240	1222·9	3500	2651	1935	1946	2180	812	1131	1105
Length { Powder Chamber, in m/m	2113·5	1845	1698·3	1695	1030	836	1124	1078·5	915	..	397·05	750	635·23	111	632·29	345·78	353	525·6	256	129	627	394·6
Length { Bore, in m/m	11180	9787	8387	7095	4879	4173	7250	4893·2	5540	2550	1881	3375	5100	934·74	3200	2113	1750	1806	2280	713	740	980·9
No. of Grooves	80	70	60	50	31	30	48	36	44	21	20	32	32	32	30	24	18	20	21	12	12	12
Depth of Grooves, in m/m	1·5	1·5	1·25	1·25	1·00	1·00	1·00	1·00	1·5	0·75	1·20	1·25	1·00	0·75	0·58	0·305	0·305	0·3	0·30	0·37	0·4	0·4
Twist of Rifling, in m/m and degrees	9600	8400	7200	6000	4200	3600	6°	4902·5	..	..	..	..	3048	1919·02	2250	1710	6°	1260	6°	1·107	1·131	1·110
Weight of the empty projectile. { Armour-piercing proj., in kgs	172·20	315·0	198·0	114·6	39190	21100	39500	39190	11350	3878	1410	..	13920	5670	6110	2605	1093	1093	2546	0·188	0·488	0·409
Weight of the empty projectile. { Common Shell, in kgs.	398·60	265·60	167·03	98·00	31946	21400	38·00	31946	40145	3770	1410	17100	12620	5600	6390	2633	1108	1108	2574	0·407	0·407	0·409
Weight of the empty projectile. { Ring Segment, in kgs.	402·30	268·00	168·50	99·00	33835	21600	..	33835	11990	3760	..	..	..	..	..	..	..	..	..	..	..	..
Weight of the empty projectile. { Semi-piercing, in kgs.	399·86	363·109	167·00	98207	31260	20013	..	31260	..	..	..	..	12920	..	..	..	..	..	..	..	..	..
Weight of the empty projectile. { Case Shot, in kgs.	..	..	..	..	..	..	..	..	..	..	..	..	..	6000	..	2224	1264	1261	2210	0·616	0·616	..
Weight of the explosive charge. { For the Armour-piercing, in kgs.	7500	5000	3000	1900	0·512	0·340	0·500	0·512	0·860	0·122	0·060	..	0·500	0·230	0·227	0·078	0·038	0·038	0·115	0·015	0·015	0·013
Weight of the explosive charge. { ,, Common Shell, in kgs	21000	14000	9000	5000	1695	0·950	1130	1695	4225	0·230	0·060	0·350	1350	0·260	0·250	0·065	0·038	0·038	0·085	0·022	0·022	0·013
Weight of the explosive charge. { ,, Ring Segment, in kgs.	17500	12000	7500	4000	1216	0·800	..	1216	0·415	0·240	..	..	..	..	..	..	..	..	..	..	..	..
Weight of the explosive charge. { ,, Semi-piercing, in kgs.	..	..	..	..	..	..	..	..	..	..	..	..	1061	..	..	..	..	..	..	..	..	..
Muzzle Velocity, in metres	620	620	617·1	620	580	612	800	736	690	710	710	600	884	300	641	570	603	590	670	404	404	549
Muzzle Energy, in metre-tons	9408	6275·9	4400	2290	673·8	469	1309	1094·7	1098	102·9	38·5	326	574·9	27	139·1	45	21·6	20·2	42·5	4	4	6·4

Corrected to April, 1910.

NAVAL ORDNANCE OF SWEDEN.

N. = belongs to the Navy. C.A. = belongs to the Coast Artillery.	Armstrong.	Armstrong.	Canet.	Canet and Bofors.	Armstrong.	Whitworth.	Bofors.	Bofors.	Bofors.	Bofors.	Bofors.	Bofors and Finspong.	Bofors.	Stockholms Vapenfabrik and Finspong.	Stockholms Vapenfabrik and Finspong.	Stockholms Vapenfabrik and Finspong.	Bofors.	Finspong.	Stockholms Vapenfabrik.	Stockholms Vapenfabrik.	Finspong.	Stockholms Vapenfabrik.	Stockholms Vapenfabrik.	Stockholms Vapenfabrik.
	25 cm.k. m/85	25 cm.k. m/89	25 cm.k. m/94	25 cm.k. m/94 B.C.	24 cm.k. m/90	24 cm.k. m/92	24 cm.k. m/96	24 cm.k. m/04	21 cm.k. m/98	15 cm.k. m/98	15 cm.k. m/03	12 cm.k. m/94 oc.k. m/97	12 cm.k. m/03	7·5 cm.k. m/05	5·7 cm.k. m/89	5·7 cm.k. m/89 B oc.k. m/99	5·7 cm.k. m/92	5·7 cm.k. m/95 ⊙ B1/95B	5·7 cm.k. m/95 C.	5·7 cm.k. m/95 D.	4·7 cm.k. m/92	4·7 cm.k. m/95	3·7 cm.k. m/98	3·7 cm.k. m/98 B
	C.A.	C.A.	N.	N.	C.A.	C.A.	C.A.	C.A.	N.	N.C.A.	N.C.A.	N.C.A.	C.A.	N.	N.	N.C.A.	N.C.A.	C.A.	C.A.	N.	C.A.	N.	N.	N.C.A.
Designation by Calibre, in cms.	25·4	25·4	25·4	25·4	24	24	24	24	21	15·24	15·24	12	12	7·5	5·7	5·7	5·7	5·7	5·7	5·7	4·7	4·7	3·7	3·7
Total Length . . . mm.	8636	8636	10670	10670	8237	8544	10320	12000	9335	6768	7620	5400	6000	3970	2737	3108	2760	1478	1504	1900	1200	2572	1368	1450
Length: Rifled Portion of Bore, mm.	6637	6550	8498	8498	6353	6618	8541	10009·3	7801·1	5693	6265·9	4665	5013	3129	2146	2517·5	2328	1049·5	1049·5	1448	817·0	2034·5	1126	1126
Length: Chamber . . .	1397	1397	1609	1609	1209	1373·1	1299·6	1508·4	1123	787·7	1049·9	474	742	560·5	265	265	229	205	262	262	175	2574	208	133·4
Length: Bore, in calibres .	32	32	40·5	40·5	32·4	33·5	41	48	42·5	42·5	48	43	48	49	·12	49	·15	22	23	30	22	49	34	34
Number of Grooves . . .	42	A. 42 B. 40	44	44	42	40	40	40	60	44	44	36	36	28	24	24	24	24	24	24	24	20	16	16
Twist of Rifling . . .	40	40 30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	25	25	27	25	30	30	30
Total Weight . . . tons	30·25	31·03	28·16	29·2	23·84	28·1	25	30·44	19·49	5·92	7·75	2·8	3·7	0·975	0·340	0·380	0·334	{0·216 / 0·206}	0·212	0·189	0·116	0·243	0·0675	0·0751
Weight: Armour-piercing Shell in kg.	204	204	204	204	181	215	215	215	125	45·4	45·4	21	21	—	—	—	—	—	—	—	—	—	—	—
Weight: Common Shell . kg.	182	182	182	182	181	215	215	—	125	—	—	21	21	6·5	2·722	2·722	2·722	2·722	2·722	2·722	1·5	1·5	0·8	0·8
Weight of Firing Charge: Armour-piercing Shell in kg.	41·78	41·78	45·2	45·2	34	45·5	43	56	28	9·8	15	4·15	6·75	—	—	—	—	—	—	—	—	—	—	—
Weight of Firing Charge: Common Shell . kg.	82	82	67	67	—	—	—	—	13·75	9·8	15	4·15	6·75	1·7	0·43	0·435	0·34	0·24	0·24	0·35	0·143	0·3	0·08	0·08
Muzzle Velocity . . m.	640	640	720	720	625	615	685	775	750	750	850	740	860	780	660	704	640	485	485	600	468	740	550	550
Muzzle Energy, total m. ton .	4258	4258	5386	5386	3609	4209	5138	6575	3564	1301	1671	586	791	202	60·4	68·7	56·8	32·64	32·64	49·95	16·73	41·80	12·3	12·3
Perforation Krupp Steel, 3000 m.	30·5	30·5	38·8	45·9	35·0	44	52	—	34	22	24·1	—	16·5	—	—	—	—	—	—	—	—	—	—	—

Corrected to February, 1910.

UNITED STATES NAVAL ORDNANCE.

GUN.	MARK.	Length in Calibres.	Total Length.	Capacity of Chamber in Cubic Inches.	Travel of Projectile in Inches.	Weight of Gun.	Weight of Projectile.	Weight of Charge.	Muzzle Velocity.	Muzzle Energy.	Penetration at Muzzle, Krupp Armour, using Capped Projectile.	At 3000 Yards. Remaining Velocity.	At 3000 Yards. Penetration.	At 6000 Yards. Remaining Velocity.	At 6000 Yards. Penetration.	At 9000 Yards. Remaining Velocity.	At 9000 Yards. Penetration.
			inch.			tons.	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.
3-in. R.F.G.	II., III.	50	151	219	128·3	0·9	13	3·85	2700	658	3·3	1230	1·2	818	0·8	..	..
3-in. S.A.	V., VI.	50	159	219	128·3	1·0	13	3·85	2700	658	3·3	1230	1·2	818	0·8	..	..
4-in. R.F.G.	III., IV., V., VI	40	161	331	131·5	1·5	33	4·85	2000	915	3·4	1156	1·7	897	1·2	..	..
4-in. R.F.G.	VII.	50	205	652	168·3	2·6	33	5·0	2500	1,430	4·6	1452	2·2	979	1·4	853	1·2
4-in. R.F.G.	VIII.	50	205	652	168·3	2·9	33	12·3	2800	1,794	5·3	1627	2·6	1033	1·5	878	1·2
5-in. R.F.G.	II., III., IV.	40	206	656	167·8	3·1	50	10·0	2300	1,834	5·3	1286	2·6	934	1·7	829	1·4
5-in. B.L.R.	V., VI.	50	256	1,200	215·6	4·6	60	19·2	2700	3,032	6·2	1692	3·5	1102	2·0	928	1·6
5-in. B.L.R.	VI	50	256	1,200	215·6	4·6	50[1]	20·5	3000[1]	3,122	6·4	1732	3·2	1057	1·7	877	1·4
5-in. R.F.G.	VII.	51	261	1,165	215·6	5·0	50	23·8	3150	3,439	6·8	1835	3·4	1091	1·8	895	1·4
6-in. R.F.G.	II., III.	30	196	1,318	145·4	4·8	105	18·8	1950	2,768	5·3	1305	3·2	1009	2·3	909	2·0
6-in. R.F.G.	IV., VII.	40	256	1,320	205·8	6·0	105	18·8	2150	3,365	6·0	1110	3·6	1058	2·4	934	2·1
6-in. R.F.G.	IX.	45	270	1,320	221·7	7·0	105	18·8	2250	3,685	6·3	1511	3·8	1086	2·5	948	2·1
6-in. B.L.R.	VI	50	300	2,101	247·5	8·3	105	30·0	2600	4,920	7·6	1770	4·7	1207	2·9	996	2·2
6-in. B.L.R.	VIII.	50	300	2,101	247·5	8·6	105	37·0	2800	5,707	8·3	1923	5·2	1297	3·2	1026	2·3
7-in. B.L.R.	II.	45	323	3,643	259·8	12·7	165	58·0	2700	8,338	9·6	1948	6·1	1382	4·2	1083	3·0
8-in. B.L.R.	III., IV.	35	305	3,170	245·8	13·1	260	43·8	2100	7,948	8·6	1576	6·0	1206	4·2	1040	3·6
8-in. B.L.R.	V.	40	343	5,243	273·1	18·1	260	78·0	2500	11,264	10·6	1898	7·5	1428	5·3	1141	4·0
8-in. B.L.R.	VI.	45	369	5,213	299·1	18·7	260	98·5	2750	13,360	12·0	2106	8·6	1589	6·1	1227	4·4
10-in. B.L.R.	I., II.	30	329	6,779	251·1	25·1	510	90·0	2000	14,141	10·7	1590	8·0	1274	6·1	1103	5·0
10-in. B.L.R.	III.	40	413	10,222	327·0	34·6	510	207·5	2700	25,772	15·6	2181	11·9	1747	9·0	1406	6·9
12-in. B.L.R.	I., II.	35	411	11,991	315·2	45·3	870	160·0	2100	26,596	14·2	1733	11·2	1433	8·8	1219	7·2
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	237·5	2400	34,738	16·8	1994	13·3	1619	10·5	1376	8·3
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	305·0[2]	2600[2]	40,768	18·5	2171	14·8	1801	11·7	1500	9·3
12-in. B.L.R.	V.	45	553	16,974	452·0	52·9	870	305·0	2700	43,964	19·1	2259	15·5	1877	12·3	1561	9·8
12-in. B.L.R.	VI.	45	553	14,970	452·0	53·6	870	340·0[3]	2850[3]	48,984	20·8	2393	16·6	1991	13·3	1653	10·6
12-in. B.L.R.	VII.	50	607	14,296	506·3	56·1	870	340·0[3]	2950[3]	52,483	21·7	2483	17·5	2071	13·9	1719	11·0
13-in. B.L.R.	I., II.	35	479	15,068	374·9	61·4	1130	180·0	2000	31,333	15·0	1679	12·0	1414	9·7	1221	8·1
14-in. B.L.R.	II.	45	612	..	..	63·1	1400	365·0	2600	65,606	28·3*	..	23·4*	..	..	..	..

* Harveyized armour.

Corrected to February, 1910.

ELSWICK B.L. AND Q.F. GUNS AND HOWITZERS.

This Table is supplied by the Manufacturers.

GUNS.

		Semi-Automatic	Semi-Automatic		Semi-Automatic			Semi-Automatic																			
Diameter of Bore ....ins.	1·85	1·85	1·85	2·24	2·24	3	3	3	4	4	4·7	4·7	4·7	6	6	6	7·5	7·5	8	8	9·2	9·2	10	10	12	12	12
do. do. ....mm.	47	47	47	57	57	76	76	76	102	102	120	120	120	152	152	152	190	190	203	203	234	234	254	254	305	305	305
Length of Bore ....cals.	40	46	50	40	50	40	50	50	40	50	40	45	50	40	45	50	45	50	45	50	45	50	45	50	40	45	50
	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons
Weight of Gun	4·51	5·0	7·5	7·5	10·5	12	18·5	23	26	42	42	53	66	6·6	8·4	8·75	13·8	15·75	18·0	20·4	26·75	28·6	36·25	38·25	51	59·3	68
do. do. ....kilos.	230	254	381	381	533	609	940	1168	1321	2134	2134	2692	3353	6706	8535	8890	14021	16003	18289	20727	27179	29059	36832	38864	51818	60252	69090
do. Projectile ....lbs.	3·3	3·3	3·3	6	6	12·5	12·5	14·33	31	31	45	45	45	100	100	100	200	200	250	250	380	380	500	500	850	850	850
do. do. .....kilos.	1·5	1·5	1·5	2·722	2·722	5·67	5·67	6·5	14·06	14·06	20·41	20·41	20·41	45·36	45·36	45·36	90·72	90·72	113·4	113·4	172·37	172·37	226·8	226·8	385·55	385·55	385·55
	oz.	oz.	lb. oz.	oz.	lb. oz.	lb. oz.	lb. oz.	lb.	lb.	lb.	lb.	lb. oz.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
do. Charge, M.D. Cordite	8·25	10·0	1 0	10	1 2·5	2 0	3 4	5·75	5·5	11	6·125	9 11	15	24	31	35·5	74	76	80	90	122	136	167	200	260	260	285
do. do. do. kilos.	0·234	0·283	0·453	0·283	0·525	0·907	1·474	2·608	2·495	4·99	2·78	4·395	6·804	10·886	14·061	16·1	33·566	34·473	36·29	40·82	55·34	61·69	75·75	90·72	117·93	117·93	129·3
Muzzle Velocity ....f.s.	2132	2300	2680	1968	2400	2210	2800	3050	2300	3000	2200	2600	3000	2500	2800	3050	2900	3000	2845	3000	2750	3000	2800	3000	2650	2800	3000
do. do. ......m.s.	650	701	817	600	731	674	853	930	701	914	670	792	914	762	853	930	884	914	867	914	838	914	853	914	808	853	914
Muzzle Energy ....f.t.	104	121	164	161	240	423	680	922	1137	1934	1510	2109	2808	4331	5436	6492	11663	12181	14031	15600	19926	23714	27181	33318	41386	46208	53040
do. do. ...... m.t.	32·2	37·5	50·8	49·8	74·3	131	210·6	285·5	352·1	598·9	467·6	653	869·6	1342·2	1683·4	2010·5	3611·9	3865·2	4345·2	4831·2	6171	7344	8418	10318	12816	14310	16426
Penetration at Muzzle ...ins.	5·2	5·7	7·3	5.6	8·0	8·8	11·6	14·4	11·9	16·0	11·6	15·45	19·4	19·5	23·1	26·3	31·8	32·75	32·9	35·7	35·9	40·8	40·9	45·1	44·6	48·5	53·7
do. do. ...mm.	132	144·7	185·4	142·2	203·2	223·5	294·6	365·7	302·2	406·4	294·6	392·4	492·7	495·3	586·7	668	807·7	832·3	835·6	906·7	911·8	1036·3	1038·8	1145·5	1132·8	1231·8	1363·9
Rounds per Minute	25	25	25	25	25	20	20	30	12	12	12	12	12	9	9	9	6	6	5	5	4	4	3	3	2	2	2

Larger Guns are under construction, but details are withheld from publication.

HOWITZERS AND FIELD GUNS.

		Naval Landing.	Jointed Gun.	Field.	Horse & Field.	Field.	Howitzers.			Field Position.	Howitzers.							
Diameter of Bore ... ... ins.	2·953	3	3	3	3	3·3	4	4·3	4·7	5	5	6	8	9·2	11	11·24	12	
,, ,, ... mm.	75	76	76	76	76	84	102	109·2	120	127	127	152	203	234	279·4	285·5	305	
Length of Bore ... ... calibres	14·13	18·8	19·2	28	23	28	8·75	12·5	12	32	8·4	12·2	12	13·7	12	15	17	
	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	lb.	cwt.	cwt.	tons	cwt.	ton	tons	tons	tons	tons	tons	
Weight of Gun	1·875	4	4·5	7·25	6	9	220	7	8	2	9	1	2·6	4·3	5·5	7·85	12·2	
,, ,, ... kilos.	95	203	229	368	305	457	100	356	406	2032	457	1016	2642	4369	5588	7976	12396	
,, Projectile ... lbs.	11·75	12·5	14·33	14·3	12·5	18·5	20	40	35	60	50	100	240	290	500	661·38	981	771
,, ,, ... kilos.	5·33	5·67	6·5	6·49	5·67	8·39	9·07	18·14	15·87	27·22	22·68	45·36	108·9	131·5	227	300	445	350
	oz.	oz.	oz.	oz.	lb. oz.	lb. oz.	oz.	oz.	lb. oz.	lb. oz.	oz.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
,, Charge M.D. Cordite	7·75	15	15	20½	1 4	1 6	9½	16¼	1 4½	9 8	12	3	7·5	14	20	32	46·29	50
,, ,, ,, kilos.	0·22	0·369	0·425	0·582	0·567	0·624	0·269	0·461	0·582	4·31	0·34	1·361	3·4	6·35	9·07	14·51	21	22·7
Muzzle Velocity ... ... f.s.	1100	1570	1485	1755	1700	1635	950	980	1150	2150	782	1000	1000	1250	1220	1230	1265	1460
,, ,, ... m.s.	335	478	452	535	518	498	290	298	350	655	238	305	305	381	372	375	385	445

Corrected to March, 1911.

VICKERS, SONS & MAXIM'S GUNS AND MOUNTINGS.

This Table is supplied by the Manufacturers.

	37 m m	37 m m	3-pdr.	6-pdr.	3-in. Semi-Auto.	4-in. Semi-Auto.	4-in. Semi-Auto.	4·7-in. Semi-Auto.	4·7-in. Semi-Auto.	6-in. Semi-Auto.	6-in. Semi-Auto.
	30 cal.	42·5 cal.	50 cal.	50 cal.	50 cal.	40 cal.	50 cal.	45 cal.	50 cal.	45 cal.	50 cal.
Diameter of Bore . .ins.	1·457	1·457	1·85	2·244	3	4	4	4·724	4·724	6	6
Length of Bore . .ins.	43·5	62	92·5	112·2	150	160	201·15	212·6	228·46	269·5	300
Length of Gun . .ins.	73·75	94	98·9	118·6	156·995	166·6	208·45	220	236·2	279·2	310·07
Weight of Projectile lbs.	1	1·25	3·3	6	12·5	31	31	45	45·14	100	100
Weight of Gun . . .	cwts. 3·75	cwts. 5 42	cwts. 5.53	cwts. 9·29	cwts. 19	cwts. 25	cwts. 41	tons. 3·18	tons. 3·2	tons. 7·42	tons. 7·8
Muzzle Velocity . .f.s.	1800	2300	2800	2600	2700	2300	3030	2800	3050	2900	3100
Muzzle Energy . .f.t.	22·5	45 85	179·4	281	632	1137	1975	2445	2910	5830	6665
Penetration of Wrought Iron Plate at Muzzle. Gavre formula . .ins.	1·9	3·3	6·7	7·5	9·65	10·8	16	15·9	17·8	22·6	24·8
Penetration of Hard Steel Plate at 3000 yards. Gavre formula . .ins.	—		—	—	—		—	—	5·0	7·8	8·8
Rounds per minute . .	300	300	30	28	25	20	15	12	12	10	10
Weight of Mounting complete with Shield . .	c. q. l. 4 1 10	c. q. l. 4 3 20	c. q. l. 11 2 0	c. q. l. 18 1 0	t. c. q. l. 1 1 1 0	t. c. q. l. 1 10 2 0	t. c. q. l. 2 6 3 0	t. c. q. l. 3 13 3 0	t. c. q. l. 6 5 3 0	t. c. q. l. 9 1 1 0	t. c. q. l. 12 0 2 0
Thickness of Shield . .	·1875	·16	ins. ·25	ins. ·25	ins. ·25	ins. ·028	none	ins. 2 & ·313	ins. 4·33	ins. 3	ins. 3 & 1·5
Weight of Shield . . .	c. q. l. 0 3 11	c. q. l. 0 1 22	c. q. l. 1 0 0	c. q. l. 1 2 8	c. q. l. 2 1 0	c. q. l. 1 1 0	none	c. q. l. 17 0 0 / 1 1 0	t. c. q. l. 2 8 2 0	t. c. q. l. 3 1 1 0	t. c. q. l. 5 5 0 0
Angle of Elevation . .	16°	15°	20°	20°	20°	20°	15°	20°	16°	15°	15°
Angle of Depression . .	25°	20°	20°	10°	10°	10°	10°	7°	7°	7°	7°

	7·5-in. Semi-Auto.	7·5-in. Semi-Auto.	8-in. Semi-Auto.	9·2-in. Semi-Auto.	9·2-in. Semi-Auto.	10-in. Semi-Auto.	10-in. Semi-Auto.	12-in. Semi-Auto.	12-in. Semi-Auto.	13·5-in. Semi-Auto.	14-in. Semi-Auto.		15-in. Semi-Auto.	
	45 cal.	50 cal.	50 cal.	45 cal.	50 cal.	45 cal.	50 cal.	45 cal.	50 cal.	45 cal.	45 cal.		45 cal.	
Diameter of Bore . .ins.	7·5	7·5	8	9·2	9·2	10	10	12	12	13·5	14		15	
Length of Bore . .ins.	337·5	375	388·75	429·3	460	450	486	510	600	607·5	630		675	
Length of Gun . .ins.	349·2	386·7	400	412·35	473	464·6	500	557·55	617·7	625·9	618·4		695·3	
Weight of Projectile lbs.	200	200	216·7	380	380	478·4	496·6	850	850	1250	1400	1488·12	1720	1950
Weight of Gun . . .	tons. 14·02	tons. 16·0	tons. 14·6	tons. 26·85	tons. 27·81	tons. 34·85	tons 28·7	tons 57·7	tons 65·85	tons 76·125	tons 80·25	tons 80·25	tons 96	tons 96
Muzzle Velocity . .f.s.	2875	3003	3090	2800	2950	2850	2863	2850	3010	2700	2615	2525	2655	2500
Muzzle Energy . .f.t.	11465	12505	14350	20660	22930	26945	28225	47875	53400	63190	66385	65790	84070	84510
Penetration of Wrought Iron Plate at Muzzle. Gavre formula . .ins.	28·75	30·75	31·5	35·3	38·0	38·9	40·2	48·3	52·1	52·8	52·0	51·5	57·2	57·5
Penetration of Hard Steel Plate at 3000 yards. Gavre formula . .ins.	10·6	11·4	12·6	14·1	15·2	15·8	16·4	21·0	22·2	22·8	22·9	22·6	25·1	25·5
Rounds per minute . .	8	8	6	4	4	3	3	2	2	1·5	1·35	1·35	1·2	1·2
Weight of Mounting complete with Shield . .	t. c. q. l.	t. c. q. l.												
Thickness of Shield . .	Depending on type of Mounting.													
Weight of Shield . . .														
Angle of Elevation . .														
Angle of Depression . .														

HOWITZERS AND FIELD GUNS.

	3-in. Mountain Gun.	3-in. Landing Gun.	3-in. Field. Light.	3-in. Field. Heavy.	Howitzers. 4·33-in.	Howitzers. 4·7-in.	Howitzers. 6-in.	Howitzers. 8-in.	Howitzers. 9·2-in.	Howitzers. 11-in.
Diameter of Bore . .ins.	3	3	3	2·95	4·33	4·724	6	8	9·2	11
Length of Bore . .ins.	42·91	66	61·96	99·46	58·45	66·15	94·5	128·8	128·8	154
Length of Gun . .ins.	47·23	70·34	69·3	103·8	63·55	71·05	102·8	138·2	141·2	148·25
Weight of Projectile lbs.	12·5	12·5	12·5	14·33	35·25	45	90·3	216·7	290	758
Weight of Gun . cwts.	2·45	3·9	4 5	7·5	7·25	9·75	18·75	46·75	tons 3	tons 5·85
Muzzle Velocity . .f.s.	1150	1640	1600	1660	1100	1000	1285	1100	1300	1000
Muzzle Energy . .f.t.	115	233	220	274	296	312	1035	1820	3400	5260
Weight of Mounting complete with Shield . .	c. q. l. 7 1 0	c. q. l. 9 2 0	t. c. q. l. 0 11 3 0	t. c. q. l. 0 14 0 0	t. c. q. l. 0 17 0 0	t. c. q. l. 0 17 2 0	t. c. q. l. 2 14 3 0	t. c. q. l. 3 11 0 0	t. c. q. l. 5 9 0 0	t. c. q. l.
Thickness of Shield . .	·125	·192	·125	·144	None	·157	·236	·236	None	
Weight of Shield . . .	c. q. l. 0 2 17	c. q. l. 1 1 15	c. q. l. 0 3 10	c. q. l. 1 0 15	None	c. q. l. 1 2 8	c. q. l. 3 3 0	c. q. l. 3 0 0	c. q. l. None	
Angle of Elevation . .	25°	25°	16°	16°	50°	43	50°	40	55	
Angle of Depression . .	15°	10°	6	10°	5°	5°	None	None	3	

Corrected to March, 1912.

COVENTRY ORDNANCE WORKS' GUNS.

This Table is supplied by the Manufacturers.

—		3-pdr., 50 cal.	6-pdr., 50 cal.	Mountain 3·3-in. 20-pdr., Howitzer.	Field. 12½-pdr., 23 cal.	Field. 15-pdr., 33·44 cal.	Field. 4·65-in. Howitzer.	Field. 6-in. Howitzer.	3-in., 40 cal.	3-in., 50 cal.	4-in., 40 cal.	4-in., 50 cal.	4·7-in., 50 cal.	6-in., 50 cal.	7·5-in., 50 cal.	9·2-in., 50 cal.	11·02-in., 50 cal.	12-in., 50 cal.	13·5-in., 45 cal.	14-in., 45 cal.
Diameter of Bore	in.	1·85	2·244	3·3	3·0	3·0	4·65	6·0	3·0	3·0	4·0	4·0	4·7	6·0	7·5	9·2	11·2	12·0	13·5	14·0
	m.m.	47	57	83·8	76·2	76·2	117·5	152·4	76·2	76·2	101·6	101·6	120·0	152·4	190·5	233·7	280	304·8	342·9	355·6
Length of Gun . .	in.	99·0	119·0	45·25	75·0	100·34	72·0	101·5	123·6	154·5	166·4	208	242·5	310	387·5	475	568	617·7	630	648·7
Weight of Charge .	lb.	1·1	1·75	0·5	1·0	1·626	1·1	5·0	2·0	5·25	5·25	11·25	16·0	31·0	71·0	95	270	285	290	300
Weight of Projectile	lb.	3·3	6·0	20·0	12·5	15·0	37·5	100	12·5	12·5	31	31	45	100	200	380	760	850	1250	1400
Weight of Gun		c. 6	c. 10	c. q. 2 2	c. 6	c. q. 8 2	c. q. 8 2	t. c. q. 1 2 2	c. q. 12 1	c. q. l. 18 2 21	t. c. q. l. 1 5 3 15	t. c. 2 2	t. c. q. 3 14 2	t. c. 8 15	t. c. 15 10	t. 28	t. 42	t. 67	t. c. 76 10	t. 81
Muzzle Velocity .	f.-sec.	2800	2800	860	1600	1850	1000	1120	2300	3000	2300	3000	3000	2950	2950	2950	2950	2950	2600	2600
Muzzle Energy .	f.-tons	179·4	326	102	222	356	260	870	458·5	780	1137	1934	2810	6034	12068	22930	15861	51290	58590	65620
Penetration of Wrought-Iron Plate at Muzzle	in.	..	..	..	..	..	..	..	7·7	11·25	10·8	16·0	17·4	23·1	29·8	37·9	51·2	50·65	49·1	51·2
Penetration of Hard Steel Plate at 5000 yards . .	in.	..	..	..	..	..	..	..	..	..	..	..	2·6	5·5	8·5	12·3	18·0	18·3	18·3	19·3

Corrected to March, 1912.

SCHNEIDER GUNS.

The information in this Table is given by the Manufacturers.

Calibre, in millimètres	400		370		340		305		240		150		120		100		75		47	37
Calibre, in inches	15·7	15·7	14·5	14·5	13·4	13·4	12·0	12·0	9·4	9·4	5·9	5·9	4·7	4·7	3·9	3·9	2·9	2·9	1·8	1·4
Length, in calibres	40	45	40	45	40	45	45	50	45	50	45	50	45	50	45	50	50	60	60	60
Weight, in tons	99·4	102·5	78·9	83·6	63·7	66·3	52·9	57·3	25·8	27·9	6·3	6·8	3·2	3·5	1·9	2·0	·85	1·2	·30	·17
Weight of A.P. Projectile, lbs.	2183	2183	1719	1719	1332	1332	826	826	407	407	99	99	48	48	28·6	28·6	14·3	14·3	3·3	1·76
Weight of Charge, in lbs.	540	540	496	496	447	447	353	375	165	176	39·6	40·7	17·8	18·4	13·2	13·8	5·5	6·2	1·3	..
Muzzle Velocity, ft.-secs.	2428	2493	2493	2575	2559	2675	2952	3116	2952	3116	2952	3116	2952	3116	2952	3116	2871	3035	3116	3116
Muzzle Energy, ft.-tons	89444	94287	74268	79272	60706	65388	50007	55717	24667	27487	6001	6686	2932	3268	1731	1931	820	917	223	119
Perforation of Steel at muzzle (ins.)	...	..	..	..	..	..	38·3	41·6	30·1	32·3	18·2	20·1	13·9	15·0	11·6	12·5	9·3	10·0	5·9	5·0
Perforation of Steel at 3000 yards (ins.)	..	..	..	..	..	..	29·3	31·9	21·2	23·1	10·2	11·8	6·4	6·9	4·6	4·9	..	..	..	..
Perforation of Steel at 6000 metres (6561 yards), ins.	17·9	18·7	16 6	17·5	15·2	16·1	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Corrected to February, 1911.

KRUPP SHIP AND COAST GUNS.

From tables supplied by the Company.

Calibre . . . . . cm.	7·5 = 2·9 in.						8·8 = 3·4 in.					
Total Length . . cals.	40		45		50		40		45		50	
Length of Bore . . mm.	3000		3375		3750		3520		3960		4400	
Total Length . . „	3195		3570		3915		3750		4190		4630	
Weight of Gun, light kg.	593	..	673	..	753	..	959	..	1087	..	1217	..
Weight of Gun, heavy . „	..	677	..	764	..	850	..	1094	..	1231	..	1373
Weight of Projectile . . „	5·8	5·8	5·8	5·8	5·8	5·8	9·5	9·5	9·5	9·5	9·5	9·5
Weight of Charge . . „	1·54	1·65	1·77	1·86	2·03	2·09	2·49	2·66	2·86	3·00	3·27	3·37
Muzzle Velocity, . . m.	816	843	866	892	913	938	811	837	860	886	907	931
Muzzle Energy mètre-tons	197·0	210·1	221·9	235·4	246·8	260·3	318·3	339·4	358·5	380·3	398·7	420·5
Muzzle Energy per mètre-	332	..	330	..	328	..	332	..	330	..	328	..
kg. of weight kilog.	..	310	..	308	..	306	..	310	..	308	..	306
Penetration at the Muzzle (Steel) . . . . mm.	195	204	212	221	229	238	231	242	252	262	271	281
Penetration at 6000 mètres mm.	..	..	..	..	..	..	..	..	..	..	..	..

Calibre . . . . . cm.	10·5 = 4·1 in.			15 = 5·9 in.			17 = 6·7 in.		
Total Length . . cals.	40	45	50	40	45	50	40	45	50
Length of Bore . . mm.	4200	4725	5250	5965	6710	7455	6905	7765	8630
Total Length . . „	4475	5000	5525	6355	7100	7845	7355	8215	9080
Weight of Gun, light kg.	1555	1755	1950	4460	5020	5590	6930	7800	8680
Weight of Gun, heavy . „	1725	1945	2165	4940	5570	6200	7670	8650	9630
Weight of Projectile . . „	16	16	16	46	46	46	70	70	70
Weight of Charge . . „	5·05	5·80	6 60	14·1	16·6	18·9	22·4	25·7	29·3
Muzzle Velocity, . . m.	810	890	936	839	888	934	848	897	943
Muzzle Energy mètre-tons	576	646	714	1651	1850	2045	2564	2873	3177
Muzzle Energy per mètre-	370	368	366	370	368	366	370	368	366
kg. of weight kilog.	334	332	330	334	332	330	331	332	330
Penetration at the Muzzle (Steel) . . . . mm.	292	317	311	426	462	496	499	541	581
Penetration at 6000 mètres mm.	..	..	..	446	476	505	488	521	553

Calibre . . . . . cm.	21 = 8·2 in.			24 = 9·4 in.			28 = 11 in.			30·5 = 12 in.		
Total Length . . cals.	40	45	50	40	45	50	40	45	50	40	45	50
Length of Bore . . mm.	8370	9420	10465	9600	10800	12000	11200	12600	14000	12200	13725	15250
Total Length . . „	8915	9965	11010	10225	11425	12625	11930	13330	14730	12995	14520	16045
Weight of Gun, light kg.	12330	13900	15450	18600	21000	23300	29550	33300	37000	38200	43000	47800
Weight of Gun, heavy „	13660	15400	17150	20600	23220	25850	32700	36900	41000	42300	47700	53100
Weight of Projectile. „	125	125	125	190	190	190	300	300	300	390	390	390
Weight of Charge . „	39·9	45·8	52·3	60·1	69·1	78·8	95	110	125	123	142	162
Muzzle Velocity . . m.	847	896	942	813	893	939	846	895	911	843	892	939
Muzzle Energy mètre-tons	4566	5116	5657	6884	7714	8529	10930	12250	13550	14130	15830	17510
Muzzle Energy per mètre-	370	368	366	370	368	366	370	368	366	370	368	366
kg. of weight kilog.	334	332	330	334	332	330	334	332	330	334	332	330
Penetration at the Muzzle (Steel) . . . . mm.	613	664	713	709	770	827	837	907	974	917	994	1069
Penetration at 6000 mètres mm.	540	576	610	573	611	648	608	648	685	624	664	704

Calibre . . . . . cm.	34·3 = 13·5 in.			35·5 = 14 in.			38 = 15 in.		
Total Length . . cals.	40	45	50	40	45	50	40	45	50
Length of Bore . . mm.	13720	15435	17150	14200	15975	17750	15200	17100	19000
Total Length . . „	14610	16325	18040	15125	16900	18675	16190	18090	19990
Weight of Gun, light kg.	51300	61200	68100	60200	67800	75400	73900	83200	92700
Weight of Gun, heavy „	60200	67800	75600	66700	75200	83700	81800	92200	102800
Weight of Projectile. „	550	550	550	620	620	620	750	750	750
Weight of Charge . „	176	202	230	195	224	255	239	274	313
Muzzle Velocity . . m.	847	896	943	840	889	935	845	895	942
Muzzle Energy mètre-tons	20100	22520	21940	22280	24960	27650	27330	30620	33910
Muzzle Energy per mètre-	370	368	366	370	368	366	370	368	366
kg. of weight kilog.	334	332	330	334	332	330	334	332	330
Penetration at the Muzzle (Steel) . . . . mm.	1040	1127	1212	1079	1170	1258	1159	1258	1354
Penetration at 6000 mètres mm.	..	..	..	651	693	732	..	..	..

Corrected to March, 1912.

BETHLEHEM STEEL CO.

ORDNANCE.

This Table is supplied by the Manufacturers.

Calibre.	Length of bore in Calibres.	Calibre.	Weight of Gun.	Weight of Projectile.	At Muzzle.		At 3000 yards Range.				At 8000 yards Range.			Limiting ranges beyond which capped armour piercing projectiles will not perforate Krupp hard-faced armour of 12 inches and 7 inches thickness.		Calibre.
					Velocity.	Energy.	Perforation of Wrought Iron. (Gavre Formula.)	Dangerous Space for Target 25 Feet high.	Energy.	Perforation of Bethlehem hard-faced armour by capped armour piercing projectiles, with normal impact.	Dangerous Space for Target 25 feet high.	Energy.	Perforation of Bethlehem hard-faced armour by capped armour piercing projectiles, with normal impact.	12-in. plate.	7-in. plate.	
inches.	calibres.	cms.	lbs.	lbs.	ft. per sec.	foot-tons.	inches.	yards.	foot-tons.	inches.	yards.	foot-tons.	inches.	yards	yards.	inches.
1·457	50	3·7	120	1	2150	37	..	..	..	..	..	..	..	..	..	1·457
1·851	50	4·7	550	3	2400	119	..	..	..	..	..	..	..	..	..	1·851
2·244	50	5·7	960	6	2400	240	..	..	..	..	..	..	..	..	..	2·244
3	50	7·62	1900	13	2800	707	..	..	..	..	..	..	..	..	..	3
			tons.													
4	45	10·16	2·3	33	2600	1,545	9·8	240	755	..	..	..	..	..	..	4
4	50	10·16	2·6	33	2800	1,793	10·9	279	889	..	..	..	..	..	..	4
5	45	12·7	3·1	50	2600	2,342	11·3	225	1,996	..	..	..	..	..	..	5
5	50	12·7	4·75	50	3000	3,118	13·8	330	1,514	..	..	..	..	..	..	5
6	45	15·24	7·2	105	2600	4,965	16·9	275	2,970	6·9	55	1,307	4·1	..	2,870	6
6	50	15·24	8·4	105	2800	5,706	18·7	321	3,478	7·6	68	1,516	4·6	..	3,890	6
7	45	17·78	12·7	165	2700	8,339	22·0	221	5,431	6·9	69	2,660	5·8	..	6,063	7
7	50	17·78	14·5	165	2900	9,619	24·3	360	6,263	10·6	89	1,948	4·8	..	7,063	7
8	35	20·32	15·2	316	2250	10,500	28·3	235	8,240	11·0	60	5,060	8·1	..	10,230	8
8	45	20·32	18·6	260	2800	14,230	29·1	350	9,860	12·3	85	5,457	8·6	3,240	10,420	8
8	50	20·32	22·3	260	2900	15,260	30·6	381	10,601	12·8	94	5,885	8·9	3,950	11,235	8
10	35	25·4	30·0	604	2250	21,200	38·6	245	16,580	14·8	65	11,120	11·5	7,300	Max. range	10
10	45	25·4	35·4	515	2800	27,990	40·8	370	21,080	17·2	95	13,160	12·8	9,075	Max. range	10
10	50	25·4	43·9	515	2900	30,020	42·6	395	22,660	18·0	108	14,490	13·5	10,000	Max. range	10
12	35	30·48	52·0	1046	2250	36,700	50·1	250	29,880	19·1	70	21,700	15·6	14,180	Max. range	12
12	45	30·48	53·8	870	2800	47,290	51·7	380	36,790	21·7	105	24,615	16·9	14,560	Max. range	12
12	50	30·48	66	870	2900	50,720	54·4	406	39,990	22·9	115	26,590	17·6	15,596	Max. range	12
14	35	35·56	57·4	1660	2150	53,190	50·4	230	44,660	22·3	70	33,650	18·7	Max. range	Max. range	14
14	45	35·56	70·3	1400	2500	60,650	55·3	313	49,610	23·7	90	35,370	19·2	Max. range	Max. range	14
18	30	45·72	60·0	2075	2150	66,490	49·2	225	52,750	21·1	65	36,360	16·7	15,100	Max. range	18

Guns less than 3-inch calibre are chambered for fixed ammunition with the powder and projectiles in brass cartridge cases. Guns from 3-inches calibre upwards, and including the 6-inch L45 gun, can be chambered to use either fixed ammunition, or chambered to use loose ammunition with the powder in cartridge bags and the projectile separate from the powder. Guns above 6-inches calibre and including the 6-inch L45 gun are chambered for loose ammunition. The breech mechanisms of all guns up to 10-inches are operated by the single motion of a hand-lever. Those of the larger guns are operated by the revolution (3 to 5 turns) of a crank.

The 8-inch, 10-inch and 12-inch L50-guns, and the 14-inch L45 gun are for use in turrets, and are of great weight at the breech in order to balance the long muzzles, so that a comparatively small barbette may be used.

Corrected to March, 1911.

BOFORS GUNS.

Table supplied by the Manufacturers.

Calibre . . . . cm.		30·5			28			25·4			24			21	
Calibre . . . . in.		12			11·02			10			9·45			8·27	
Length of Gun . . . . cal.	50	45	40	50	45	40	50	45	40	50	45	40	50	45	40
Length of Gun . . . . in.	600·4	540·3	480·3	551·2	496·1	441	500	450	400	472·4	425·2	378	413·4	372	330·7
Weight of Gun . . . . tons	50	44	40	39	35	30	29	26	23	24	22	19	16	14·4	12·8
Weight of Projectile . . . lb.	981	981	981	761	761	761	564	564	564	474	474	474	309	309	309
	772	772	772	595	595	595	445	445	445	375	375	375	249	249	249
Weight of Charge . . . lb.	266	239	213	205	184	164	153	138	123	129	116	103	84	75·8	67·5
Muzzle Velocity . . . ft.-secs.	2776	2625	2477	2776	2625	2477	2789	2638	2490	2789	2638	2490	2828	2677	2526
	3140	2969	2802	3140	2969	2802	3140	2969	2802	3140	2969	2802	3150	2979	2812
Muzzle Energy . . . ft.-tons	52583	47019	41877	40767	36452	32468	30536	27320	24349	25647	22944	20448	17174	15391	13705
Penetration of soft steel plate at muzzle de Marres formula in.	39·8	36·8	33·9	36·4	33·6	30·9	32·9	30·3	27·9	30·8	28·5	26·2	26·7	24·7	22·7
Number of rounds per minute .	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4

Calibre . . . . cm.		19·4			15·24			12			10·5			8·7			7·5	
Calibre . . . . in.		7·64			6			4·72			4·13			3·43			2·95	
Length of Gun . . . . . cal.	50	45	40	50	45	40	50	45	40	50	45	40	50	45	40	50	45	40
Length of Gun . . . . . in.	381·9	343·7	305·5	300	270	240	236·2	212·6	189	227·4	206·7	186	188·4	171·3	154·1	162·4	147·6	132·9
Weight of Gun . . . . tons	12·8	11·6	10·3	5·8	5·3	4·7	2·96	2·56	2·37	2·2	2	1·8	1·88	1·14	1·05	0·72	0·665	0·59
Weight of Projectile . . . lb.	251	251	251	112·4	112·4	112·4	59·5	59·5	59·5	39·7	39·7	39·7	22·7	22·7	22·7	14·5	14·5	14·5
	198	198	198	90·4	90·4	90·4	46·3	46·3	46·3	30·9	30·9	30·9	17·6	17·6	17·6	11·5	11·5	11·5
Weight of Charge . . . lb.	68·1	61·3	54·7	33·1	29·8	26·5	16·2	14·5	12·9	10·8	9·7	8·7	6·14	5·53	4·92	3·92	3·53	3·13
Muzzle Velocity . . . ft.-secs.	2786	2635	2487	2897	2749	2582	2789	2638	2474	2871	2733	2585	2864	2726	2582	2848	2717	2572
	3140	2969	2802	3235	3051	2884	3143	2973	2805	3251	3097	2933	3248	3084	2936	3215	3074	2907
Muzzle Energy . . . ft.-tons	13566	12136	10815	6565	5913	5215	3220	2881	2567	2267	2057	1841	1292	1169	1049	817	742·7	668·5
Penetration of soft steel plate at muzzle de Marres formula in.	24·6	22·7	20·9	19	17·6	16·1	14·7	13·6	12·5	13·2	12·3	11·4	10·8	10·1	9·4	9·2	8·5	7·9
Number of rounds per minute .	5	5	5	9	9	9	11	11	11	15	15	15	17	17	17	20	20	20

Corrected to February, 1911.

Table Relating to Conversion of Measures.

Length.

Metric to English.						English to Metric.			
I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards	of feet	of inches	of mètres	of mètres	of centimètres
in 2354 mètres	in 12·4 mètres	in 30·5 centimètres	in 1026 yards	in 1742 feet	in 17·72 ins.
(see cols. I. & II.).	(see cols. I. & III.).	(see cols. I. & IV.).	(see cols. V. & VI.).	(see cols. VII. & VIII.).	(see cols. IX. & X.)
mètres. yards.		Note, 1 m.=100 cm.		feet. mètres.	inches. cms.
2000=2187·3	mètres. feet.		yards. mètres.	1000=304·79	10·0 =25·400
300= 328·09	10 =32·809	cms. inches.	1000=914·38	700=213·36	7·0 =17·780
50= 54·68	2 = 6·562	30·0=11·811	20= 18·29	40= 12·19	0·7 = 1·778
4= 4·37	0·4= 1·312	·5= ·197	6= 5·49	2= 0·61	·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun ; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch ; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English.						English to Metric.			
I. Kilo-grammes	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V. Tons.	VI. Milliers.	VII. Pounds Avoir-dupois.	VIII. Kilo-grammes.	IX. Grains. Troy.	X. Gramme
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons	of pounds	of grains	of milliers	of kilogrammes	of grammes
in 35 milliers	in 56·3 kilo-grammes.	in 120 grammes	in 38 tons	in 68 pounds	in 85 grains
(see cols. I. & II.	(see cols. I. & III.).	(see cols. I. & IV.	(see cols. V. & VI.).	(see cols. VII. & VIII)	(see cols. IX. & X.).
Note, 1000 kg. =1 millier).		Note, 1000 grms. = 1 kg.)			
milliers. tons	kgrms. lbs.	grammes. grains.	tons. milliers.	lbs. kgs.	grains. grammes.
30 = 29·63	50 =110·231	100=1543·23	30 = 30·48	60 = 27·216	80 = 5·184
5 = 4·92	6 = 13·228	20= 308·65	8 = 8·13	8 = 3·629	5 = 0·324
	0·3= ·661				
∴ 35 = 34·45	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy = 1 pound avoirdupois.

PRESSURE.

Metric to English.			English to Metric.				Atmospheric to English.		English to Atmospheric.	
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
Kilo-grammes per square centi-mètre.	Pounds per square inch.	Tons per square inch.	Pounds per square inch.	Kilo-grammes per square centi-mètre.	Tons per square inch.	Kilo-grammes per square centi-mètre.	Atmo-spheres.	Tons per square inch.	Tons per square inch.	Atmo-spheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152·38
2	28·446	·01279	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21003	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371·43

Note.—One atmosphere is taken to be 14·7 lbs. per square inch.

Explanation.—To convert any number from one measure to the other, take the value of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).

kgs. per sq. cm.	lbs. per sq. in.
30 =	426·68
2 =	28·45
0·1 =	1·42
∴ 32·1 =	456·55

of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).

kgs. per sq. cm.	tons per sq. in.
3000 =	19 05
200 =	1·27
10 =	·06
∴ 3210 =	20·38

of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).

lbs. per sq. in.	kgs. per sq. cm.
10 =	·7031
5 =	·3516
∴ 15 =	1·0547

of kilogrammes per square centimètre in 18 3 tons per square inch (see cols. VI. & VII.).

tons per sq. in.	kgs. per sq. cm.
10 =	1574·9
8 =	1259·95
0·3 =	47·25
∴ 18·3 =	2882·10

of tons per square inch in 3254 atmospheres. (see cols. VIII. & IX.).

atmospheres.	tons per. sq. inch.
3000 =	19·69
200 =	1·31
50 =	·33
4 =	·03
∴ 3254 =	21·36

of atmosphere in 14·6 tons per square inch (see cols. X. & XI.).

tons per sq. in.	atmospheres.
10 =	1523·8
4 =	609·5
0·6 =	91·4
∴ 14·6 =	2224·7

ENERGY.

Metric to English.		English to Metric.	
I.	II.	III.	IV.
Mètre-tons.	Foot-tons.	Foot-tons.	Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).

mètre-tons.	foot-tons.
4000 =	12916·2
300 =	968·72
60 =	193·74
7 =	22·60
∴ 4367 =	14101·26

of mètre-tons in 3592 foot-tons (see cols. III. & IV.).

foot-tons.	mètre-tons.
3000 =	929·1
500 =	154·84
90 =	27·87
2 =	·62
∴ 3592 =	1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versa*.

1 inch steel = $1\frac{1}{4}$ inches iron;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9·4 \times \frac{4}{5} = 7·52 \text{ inches steel;}$$

or, given 5·2 inches steel,

$$5·2 \times \frac{5}{4} = 6·5 \text{ inches iron.}$$

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

STATEMENT showing the NET EXPENDITURE from NAVY VOTES and LOANS on account of NAVAL SERVICES for the Years 1901–2 to 1910–11, together with the ESTIMATES for 1911–12 and 1912–13.

Year.	Total Expenditure from Navy Votes (Net).	Annuity in Repayment of Loans under the Naval Works Acts.	Total Expenditure exclusive of Annuity [Column (2) deducted from Column (1).]	Expenditure from Loans under Naval Works Acts.	Total of Columns (3) and (4).	Expenditure on New Construction (Vote 8).
	(1) £	(2) £	(3) £	(4) £	(5) £	(6) £
1901–2	30,981,315	122,255	30,859,060	2,745,176	33,604,236	8,865,080
1902–3	31,003,977	297,895	30,706,082	3,198,017	33,904,099	8,534,917
1903–4	35,709,477	502,010	35,207,467	3,261,083	38,468,550	11,115,733
1904–5	36,859,681	634,238	36,225,443	3,402,575	39,628,018	11,263,019
1905–6	33,151,841	1,015,812	32,136,029	3,313,604	35,449,633	9,688,044
1906–7	31,472,087	1,094,309	30,377,778	2,431,201	32,808,979	8,861,897
1907–8	31,251,156	1,214,403	30,036,753	1,083,663	31,120,416	7,832,589
1908–9	32,181,309	1,264,033	30,917,276	948,262	31,865,538	7,406,930
1909–10	35,734,015	1,325,809	34,408,206	—	34,408,206	9,597,551
1910–11	40,419,336	1,322,752	39,096,584	—	39,096,584	13,077,689
1911–12 (estimated)	44,392,500	1,322,752	43,069,748	—	43,069,748	15,063,877
1912–13 (estimated)	44,085,400	1,322,752	42,762,648	—	42,762,648	13,971,527

First Lord's Statement explanatory of Navy Estimates, 1912-13.

These Estimates have been framed on the assumption that the existing programmes of other naval Powers will not be increased. In the event of such increases, it will be necessary to present supplementary Estimates, both for men and money.

The Estimates for 1912-13 amount to £44,085,400, as compared with £44,392,500, for the current year.

The principal increases occur under the heads of Pay of *Personnel* (Vote I.), Naval Armaments (Vote IX.), and Works (Vote X.).

The numbers required for manning the Fleet are 2000 more than were asked for in the Estimates for the current year. This increase is due mainly to the requirements of new ships now being placed in commission and under construction. The increase of £115,500 in Vote I. is due chiefly to the pay required for the additional *personnel*.

The increase in the armaments vote is mainly due to the requirements of new construction.

Vote X. shows an increase of £449,700. The important new works at Rosyth and Portsmouth have reached a stage of development at which the contractors must earn very large sums if they are to complete the works within the contract time. No new works of great magnitude are proposed for the coming year. The large increase in expense is solely due to the maturing of the definitely contracted obligations of the State. The annuity in repayment of loans under Naval Works Acts remains at the same total as in 1911-12, and the annual addition of this charge of £1,322,000 should not be overlooked in comparing British Naval Estimates with those of foreign countries.

Increases under Votes XII., XIII., XIV., and XV. are mainly automatic, the non-effective charge being increased by £95,000.

The shipbuilding vote (Vote 8, Sections I., II., and III.) shows a decrease of £1,236,000, the expenditure falling upon 1912-13 in respect of old programmes being less than the corresponding charges in 1911-12. The diminution upon the head of construction is largely neutralised by the growing cost and numbers of the *personnel*, by the rise in prices, by the greater quantities of fuel required by the increasing horse-power of warships, by the growing size and number

of the guns carried by warships, as well as by the heavy charges in respect of Rosyth. Most of these tendencies will be fully operative in future years.

New construction will cost £13,971,527, as against £15,063,877 for 1911–12. Of this amount £12,067,727 will be spent on the continuation of work on the ships already under construction, and £1,903,800 for beginning work on ships of the new programme, which is composed as follows:—

4 large armoured ships,
8 light armoured cruisers,
20 destroyers,
together with a number of submarines and subsidiary craft.

The total cost of the new programme is £12,474,400, as compared with £13,200,000 in 1911–12. The proportion of the new programme to be undertaken in the new financial year is larger than usual. This will enable the whole of the torpedo-boat destroyers to be begun at once, and will incidentally relieve to some extent future liabilities.

It is in conclusion my duty to record the retirement of Admiral of the Fleet Sir Arthur Wilson from the active list of the Navy, and the regret with which the close of his long, eminent, and single-minded service is viewed by all who have had the honour to serve with him or under him.

I attach the usual statement of work done by the department during the past year, together with a reprint of the War Staff Memorandum, which was published in January last.

ADMIRALTY,
March 4, 1912.

WINSTON SPENCER-CHURCHILL.

SHIPBUILDING.

Between April 1, 1911, and March 31, 1912, the following ships will have been completed and become available for service:—

4 Armoured Ships (Hercules, Orion, Monarch, Colossus).
4 Protected Cruisers (Dartmouth, Weymouth, Yarmouth, Falmouth).
2 Unarmoured Cruisers (Blonde, Active),
20 Destroyers (Nautilus, Acheron, Archer, Brisk, Ferret, Defender, Minstrel, Forester, Druid, Nereide, Hind, Jackal, Nymphe, Sandfly, Lapwing, Ruby, Fury, Tigress, Sheldrake, Ariel).
5 Submarines (D 3, D 4, D 5, D 7, D 8).
Miscellaneous (Adamant, Watchful, Esther, Daisy).

On April 1, 1912, there will be under construction:—

10 Battleships.
6 Battle-cruisers (including one each for the Commonwealth of Australia and the Dominion of New Zealand).
8 Second-Class Protected Cruisers (including two for the Commonwealth of Australia).
2 Unarmoured Cruisers.
31 Torpedo-Boat Destroyers.
15 Submarines (including two for the Commonwealth of Australia).
2 River Gunboats.

New Construction.

The Hercules and Colossus have been completed and commissioned.

The Orion class is nearing completion; the Orion herself has been completed and commissioned. The Monarch has completed her ordinary programme of steam trials, and is now preparing for final trials for acceptance. The Thunderer is now undergoing trials. The Conqueror will be ready for trials early in next financial year.

The King George V. and Centurion, which were laid down in January last year at Portsmouth and Devonport respectively, have been launched. Substantial progress has been made on both ships, and it is hoped that they will be completed within a period of two years from the date of laying down. Progress has also been made with the Ajax and Audacious, which have been laid down at Greenock (Messrs. Scott's) and Tranmere (Messrs. Cammell Laird) respectively.

Of the four battleships provided for in the 1911–12 programme, two, the Iron Duke and the Marlborough, have been laid down at Portsmouth and Devonport respectively, and two, the Delhi and the Benbow, have been provisionally ordered from Messrs. Vickers and Messrs. Beardmore.

The New Zealand and Australia, which are being built for the New Zealand and Australian Governments respectively, were launched in July and October last.

Of the battle-cruisers, the Lion has carried out her ordinary programme of steam trials, with the exception of the final acceptance trial, and is now preparing for completion. Opportunity has been taken for carrying out certain alterations which experience has shown to be desirable. The Princess Royal has been launched at Barrow-in-Furness, and the Queen Mary, building at Jarrow, will be launched on the 20th of this month.

The battle-cruiser Tiger, of the 1911–12 programme, has been provisionally ordered from Messrs. John Brown and Sons.

Three protected cruisers of the Weymouth class, the Weymouth, Dartmouth, and Falmouth, have been completed and commissioned. The remaining vessel, the Yarmouth, has completed her steam trials, and is expected to be commissioned shortly.

The five vessels of the Melbourne class, including two for Australia, have been laid down; and the Chatham was launched at Chatham in November last.

Tenders have been received for the three protected cruisers of an improved Melbourne type, to be built by contract, and the order for one has been placed provisionally at Elswick. Orders for the other two are about to be assigned. A cruiser of this type, the Brisbane, is being built by the Commonwealth of Australia.

Of the unarmoured cruisers, the Blonde and Active have been completed at Pembroke and commissioned; and the Amphion and Fearless are both under construction at that Yard: the former was launched in December of last year, and will be completed about October next.

The remaining destroyer of the 1908–09 programme, the Nautilus, has been delivered by the Thames Iron Works Company. All the vessels of the Acorn class, 1909–10 programme, have been delivered. Of the destroyers of the 1910–11 programme, eight have been delivered and are in commission. The remainder are well advanced, and it is expected that several will be delivered before the end of the current financial year. Of the twenty vessels of the 1911–12 programme, thirteen have been ordered, and tenders for the remaining seven have been provisionally accepted.

Good progress has been made with the construction of submarines. The depôt ships for submarines, the Maidstone, and her tenders, the Adamant and Alecto, have been well advanced, and it is expected that the Adamant will be completed this financial year.

The surveying ships Endeavour and Esther are well advanced; the Daisy has been delivered.

Tenders have been invited for the two shallow-draught steamers, Kingfisher and Rail, for service in China.

An order for a new depôt ship, the Woolwich, for torpedo-boat destroyers was placed with the London and Glasgow Company last July.

The two floating docks for Portsmouth and the Medway will be completed early in the next financial year; a small floating dock for destroyers has been completed at and placed at Harwich; and one for submarines, to be stationed ultimately at Dover, will be completed by the end of this month.

Administration.

The Right Honourable Sir Francis J. S. Hopwood, G.C.M.G., K.C.B., has been appointed to be Additional Civil Lord on the Board of Admiralty. Sir C. Inigo Thomas, G.C.B., after 46 years' distinguished service in the Admiralty and over four years as Permanent Secretary, has retired under the age rule and been succeeded by Sir W. Graham Greene, K.C.B.

A Naval War Staff has been created, and is working on the lines laid down in the Memorandum reprinted on page 385, under the direction of Rear-Admiral E. C. T. Troubridge, C.B., C.M.G., M.V.O., who has been appointed Chief of the Staff.

Effect has been given to the recommendations of the Committee appointed to inquire into the organisation of the Department of the Accountant-General of the Navy.

A Committee, with the Civil Lord of the Admiralty as Chairman, has been appointed to inquire into the staff of the Admiralty Works Department.

Imperial Conference and Naval Policy of the Dominions.

The Imperial Conference of 1911 led to an agreement with the Canadian and Australian Governments as to the status and discipline of the Dominion Naval Forces and their relations with the Royal Navy.

His Majesty the King has been pleased to approve the designations "Royal Australian Navy," "His Majesty's Australian Ships," and "Royal Australian Naval Reserve." The report of Admiral

Sir Reginald Henderson, K.C.B., to the Commonwealth Government has been published, and, although the scope of its recommendations is such that on many points no immediate decision is to be expected, the Commonwealth Government has expressed its obligation to Sir R. Henderson, and has given, or is about to give, effect to certain portions of the report which are more immediately applicable. The arrangements which will be necessary to effect the change from an Australian squadron controlled by the Admiralty to the Australian fleet unit controlled by the Commonwealth are being elaborated. Special provision will probably be necessary for the period of transition.

Arrangements for the maintenance of certain ships in New Zealand waters, consequent on the institution of an Australian fleet, are now in progress. It is intended that H.M.S. New Zealand, the battle-cruiser which the Dominion has generously presented to the Royal Navy, shall visit New Zealand immediately after commissioning, probably early in 1913.

The Government of the Union of South Africa is proposing by a Bill now before the Union Parliament to make provision for a division of the Royal Naval Volunteer Reserve, which will be trained under the supervision of the Admiralty and will be at the disposal of His Majesty's Government in war, all charges falling on the revenues of the Union.

The development of the naval policy of Canada is at the moment somewhat uncertain. Until the proposals of the new Dominion Government are formulated, it is not possible to say how far the organisation of the recently constituted Royal Canadian Navy will be modified; but the Admiralty will earnestly co-operate in any scheme which will enable Canada to take a real and effective part in the naval defence of the Empire.

The Sea-going Fleet.

Fleet Exercises.

Combined exercises were carried out off the S.W. coasts of England and Ireland at the end of June and beginning of July, and in the North Sea later in July. The ships which took part in these were drawn from the Home and Atlantic Fleets and Fourth Cruiser Squadron. The Third Division of the Home Fleet and some ships of the Fourth Division were completed to full crews, and special exercises with torpedo craft also took place.

A series of combined exercises has been in progress off the coast of Spain since the middle of January, the several divisions of the

Home Fleet and the Mediterranean and Atlantic Fleets successively taking part. The Spanish Government has again courteously accorded permission for the fleets so engaged to make use of Spanish anchorages.

Ceremonies and Visits.

His Majesty the King reviewed the Fleet at Spithead in June last on the occasion of Their Majesties' coronation. Officers from the foreign ships attended the ceremonies in London. His Majesty's ships were stationed, so far as possible, at British ports all over the world in order to participate in the celebrations on the 22nd June. The Commander-in-Chief on the China Station, with a large detachment from his flagship, was present at Shanghai on this day, and the Chinese and Foreign communities displayed the keenest sympathy in the rejoicings. The Japanese Government did honour to the occasion by stationing Japanese men-of-war at various ports of Japan and at Shanghai and Hong Kong to take part in the ceremonies. At Buenos Ayres H.M.S. Glasgow was honoured by a special visit from the President of the Argentine Republic.

The First and Second Divisions of the Home Fleet were present in Dublin Bay on the occasion of His Majesty's State visit to Dublin, and the Second Division at Aberystwith, when His Majesty visited that place. A guard of honour from His Majesty's ships Carnarvon and Cochrane took part in the ceremonies attending His Royal Highness the Prince of Wales's Investiture at Carnarvon.

A squadron of four armoured cruisers, under the command of Rear-Admiral Sir Colin R. Keppel, K.C.I.E., K.C.V.O., C.B., D.S.O., escorted His Majesty on his recent voyage to India in H.M.S. Medina. The Mediterranean Fleet assisted in the entertainment of a French Squadron under Vice-Admiral Boué de Lapeyrère which visited Malta to greet His Majesty on his return voyage. The relations of the two navies were marked by much cordiality.

The Kent and Challenger carried out the visits to Chile and other South and Central American Republics which were arranged in the previous year. They were received with signal hospitality at all the places visited.

The Astraea conveyed the special British Mission to Siam on the occasion of the Coronation of the King at Bangkok.

The Weymouth visited Ferrol at the beginning of February, in order to be present at the launch of the first Spanish Dreadnought.

The Barham visited Galatz in October last during the Session of the Danube Commission.

General Service of the Fleet.

The ships of the East Indies Squadron have, as in previous years, been engaged in the suppression of the traffic in arms in the Persian Gulf and vicinity. The operations, under the general direction of Rear-Admiral Sir Edmund Slade, K.C.I.E., K.C.V.O., Commander-in-Chief on the East Indies Station, have been prolonged and arduous, but there is reason to hope that the traffic is becoming increasingly unprofitable, owing to the vigilance exercised by His Majesty's ships.

The unsettled conditions in China have added greatly to the responsibilities of the Commander-in-Chief and to the work of the squadron stationed in these waters. The contending parties have fortunately been able for the most part to restrain their followers from attacks on European residents, but it was necessary for a time to land parties from the fleet at Canton and Hankow. It has been considered advisable temporarily to strengthen the squadron by the addition of the Pegasus and Prometheus from the Australian Station, and the Defence is on her way to join permanently the British force available in these waters.

In conjunction with French and Russian ships, vessels of the Mediterranean Fleet have been engaged in Crete in carrying out the policy of the Protecting Powers.

Changes in Constitution of the Fleet.

Home Fleet.

An additional fully-manned destroyer flotilla is in course of formation; it comprises the destroyers of the 1910–11 programme which are now being delivered by contractors.

Atlantic Fleet.

The Fifth Cruiser Squadron is being strengthened by the replacement of the Good Hope by the Shannon as flagship. The Amethyst, hitherto affiliated to the Atlantic Fleet for service on the east coast of South America, has been replaced by the Glasgow, a more powerful and modern cruiser.

Three submarines have been stationed at Gibraltar.

Mediterranean Fleet.

The Aboukir, in the Sixth Cruiser Squadron, has been replaced by the Hampshire, and the Bacchante, in the same squadron, has been replaced by the Good Hope as flagship. The older destroyers on the

station (those of the 27-knot class) have been replaced by more modern destroyers of the "River" class.

Three submarines have been stationed at Malta.

Fourth Cruiser Squadron.

The Melpomene and Aeolus (which has replaced the Scylla) have been engaged, as in former years, on duties in the West Indies and on the east coast of Central America. The Brilliant was employed in Newfoundland waters during the fishery season; she has now been replaced by the Sirius.

China.

The older destroyers on the station (those of the 27-knot class) have been replaced by more modern destroyers of the "River" class.

Australia.

The armoured cruiser Drake has relieved the protected cruiser Powerful as flagship on this station.

Cape of Good Hope.

The composition of this squadron has remained unaltered.

East Indies.

Additional vessels have continued to be employed as in recent years in connection with the suppression of the arms traffic. The Redbreast has been withdrawn.

West Coast of America.

The Shearwater and Algerine again carried out cruises to various ports in North and South America. The Behring Sea patrol was carried out by the Algerine.

Cadets' Training Ships.

The Cornwall and Cumberland continue to be employed on this service. Their cruises have included visits to North America and to Mediterranean waters.

Coast-guard and Fishery Service Vessels.

The Watchful has been added to these vessels. The Fanny has been withdrawn.

Home Ports.

In accordance with the statement issued in January, the yachts of the Commanders-in-Chief at Devonport and the Nore have been withdrawn from service, and the vessel at Portsmouth will be paid off during the summer

PERSONNEL.

The first officers entered under the system of common entry passed their examinations for the rank of Lieutenant in May last, and since then two further terms have passed. Regulations have been issued as to the manner in which such officers may specialise in engineering and for marine duties after passing for the rank of Lieutenant. Briefly, officers who wish to specialise in engineering will be eligible to commence specialisation in two to three years after reaching the rank of Sub-Lieutenant. After qualifying, they will remain officers of the military branch, being designated Lieutenants (E), and will conform to all the regulations applicable to that branch. The pay will be the same as that of other Lieutenants, with a specialist allowance in addition. It is the intention of the Board of Admiralty that the submarine service shall be regarded as a province specially suited to the employment of such officers.

Officers selected to qualify as marine officers will be eligible to commence their course of instruction in military subjects eight months after reaching the rank of Sub-Lieutenant. On the conclusion of the course, an officer will receive a commission as Lieutenant, Royal Marines, and will as a general rule remain attached to the corps during the whole of his service, conforming to all the regulations of the Royal Marines. Provision has, however, been made for the transfer of a marine officer to the general naval service at a later stage in his career, should such reversion be considered desirable. A special scale of pay has been laid down for future marine officers as promised in December, 1902, when the system of common entry was announced.

In addition to officers who join the Royal Marines after passing through the ranks of Midshipman and Sub-Lieutenant, it has been decided to enter officers from outside candidates as may be required. The first examination for direct entry was held in December last, and eleven officers have been entered as probationary Second Lieutenants, Royal Marines.

The development of aviation for naval purposes has been the subject of special attention, and all possible measures have been taken to procure an adequate and immediate supply of trained officers and mechanics.

The establishments of Lieutenants, Accountant Officers, and Warrant Officers of the military branch have been increased to meet the growing requirements of the Fleet.

The retired pay of Paymasters-in-Chief, retired from that rank on the active list, has been increased by granting an addition of £10 a

year for each year's service in the rank on the active list with a maximum of £500.

Twenty-six officers have been lent to the Australian Government to assist in the development of the Royal Australian Navy. It has been decided that officers lent to Dominion naval forces are in future to be supernumerary to the lists of officers authorised for the Royal Navy. A Captain of the Royal Navy has been selected to act as naval adviser to the High Commissioner for the Commonwealth of Australia in London.

In accordance with the recommendations of the Committee which was appointed to enquire into the naval medical service, considerable changes in the organisation and conditions of service of this branch of the Royal Navy were brought into operation on the 1st July last. These changes include an alteration in the title of the ranks of Inspector-General and Deputy Inspector-General of Hospitals and Fleets, who will be known in future as Surgeon-General and Deputy Surgeon-General, Royal Navy; an increase in the scale of full pay of medical officers; and the grant of charge pay to the senior medical officers of large ships.

The conditions of employment in Her Majesty Queen Alexandra's Royal Naval Nursing Service have also been improved in accordance with the recommendations of the Committee.

It has further been decided to establish a naval medical school of instruction, and research at the Royal Naval College at Greenwich, and the school is now in process of development. Professors of hygiene and of bacteriology and clinical research have been appointed. Revised courses of postgraduate instruction will be introduced for naval medical officers, to include a six months' course prior to advancement to Staff Surgeon, and a second course of three months for more senior officers.

A system of accelerated promotion to Staff Surgeon has been introduced for Surgeons, according to the standard they reach in examination for the higher rank.

These changes will be carried out concurrently with the development of the Naval Medical School.

Special courses of instruction have been instituted at the naval hospitals to enable sick berth ratings to qualify as operating room and laboratory attendants, extra remuneration being granted to ratings so qualified. The pension scale of Head Wardmasters has been improved, and their number has been increased from four to eight. The nursing staffs of the naval hospitals are being enlarged to a standard which will enable them to deal not only with ordinary requirements, but also with epidemics or other emergencies.

A revised scheme for the enrolment and training of Surgeons in

the Royal Naval Volunteer Reserve has been drawn up, in order to increase the reserve of medical officers available in war. Arrangements have also been made with the civil hospitals for the supply of trained nurses in war-time.

The members of the conference which was appointed to consider the question of preventing the spread of tuberculosis have visited certain of His Majesty's ships and naval establishments during the year, and their recommendations are now under consideration.

During the financial year 1910–11, 11,770 naval ratings and 1092 marines were recruited from the shore through the various recruiting agencies. This was the largest entry for many years past; and with the exception of armourers and painters, no difficulty was experienced in completing the full requirements of all branches.

The large entries of boys and youths required to supply the seaman class *personnel* of the Fleet, have put considerable pressure on the training establishments at Shotley and in H.M.S. Impregnable and H.M.S. Ganges II. The question of accommodation is being carefully examined by a departmental committee, and in the meantime, to avoid the risk of overcrowding, drafts of boys have been sent to ships of the Home Fleet for sea training.

The system under which certain education authorities are invited to recommend candidates for entry as boy artificers has been revised so as to include the education authorities in most of the large towns in the United Kingdom. Candidates so entered are required to pass a competitive examination. The prospects of this rating continue to attract a very large number of candidates.

Very satisfactory reports continue to be received on the engine-room artificers who have been trained from boy artificers, and also on men completing their training for mechanicians, and on the mechanicians in sea-going ships.

The steps taken to improve the standard of cooking on board ship are being continued, and accelerated advancement is granted to naval cook ratings who show marked proficiency.

The general mess system has been extended during the year to the Royal Naval Barracks, Devonport. The general mess is now in operation at each of the three naval ports, and appear to be increasingly popular with the men in shore establishments.

The new detention quarters which have been built at Chatham and Portsmouth were opened in December last. The detention quarters at Devonport are also ready for occupation. It is too soon to express any final opinion as to the effect of the application of the detention system to the Navy, but there is every indication that it will prove an unqualified success.

Royal Marines.

The numbers borne on the 31st March, 1912, will be about 15,800. There will also be about 1400 bank ranks afloat and under training, an increase of 100 on the previous year.

The number of re-engaged men now serving to complete time for pension is 4318, as compared with 4115 last year.

Nineteen non-commissioned officers have qualified for and been promoted to the new warrant rank of Royal Marine Gunner, and are now serving in ships of the "Dreadnought" class.

The numbers of Marines qualified in the higher gunnery ratings, including those qualified as Gunnery Instructors, are as follows:—

Gunlayers, 1st class	101
Gunlayers, 2nd class	454
Gunlayers, 3rd class	417

The work of re-arming and re-equipping the corps with short rifles and with new pattern equipments, which was begun in 1910, will shortly be completed.

Coast-guard.

The establishment of Coast-guard officers and men remains at 3100, and entries from the fleet have been continued throughout the year.

The numbers borne on 1st January, 1912, were:—

District Captains, District Paymasters and Staff.	35
Divisional Officers	75
Chief Officers and Men	2,938
	3,048

Royal Fleet Reserve.

The total numbers of the Royal Fleet Reserve have increased from 21,943 to 24,082, the distribution of these numbers on 31st December, 1911, being as follows:—

—	Class A.	Class B.	Total.
Seamen and Naval Pensioners .	3,662	8,530	12,192
Stokers	1,847	5,025	6,872
Marines	1,746	3,272	5,018
	7,255	16,827	24,082

The increase in Class A amounted to 365, and in Class B to 1774.

At the end of the year there were 2777 special service men in the Reserve as against 1421 at the beginning.

Royal Naval Reserve.

The strength of the Royal Naval Reserve (Home) on January 1st, 1912, was :—

Executive officers	1,289
Commissioned Engineer officers . . .	200
Assistant Paymasters	98
Warrant Engineers	143
Engine Room Artificers	580
Seaman ratings	10,703
Stoker ratings	5,425

Of the executive officers, 574 have undergone twelve months' training in the fleet and are in receipt of training fees. In addition to these, 63 are now undergoing this training.

The following numbers have performed courses of instruction during the twelve months ending December 31st, 1911 :—

—	Short Courses.		Annual or Biennial Training.	
	Gunnery and Torpedo.	Signal.	Three Months' Training Afloat.	28 Days.
Officers of the Military Branch .	141	16	—	280
Assistant Paymasters . .	—	—	—	74
Warrant Engineers . . .	—	—	7	—
Engine-room Artificers . .	—	—	100	—
Seamen ratings . . .	—	—	729	3,348
Stoker ratings	—	—	243	1,572

The old system of drill of executive officers and seamen and stoker ratings of the Royal Naval Reserve on board harbour drill ships and at shore batteries has been finally superseded during the past year by the new system of training on board effective ships in commission, by which the *personnel* of the Reserve are brought more directly into touch with the actual conditions of the Naval Service, and the duties and ships in which they would be employed when called out for service in the Fleet. From the reports received from commanding officers, the new system appears to be working satisfactorily, and to be popular with both officers and men.

The Royal Naval Reserve Decoration has already been awarded

to 231 officers; and approximately 7500 men have been granted the Long Service and Good Conduct Medal.

The number of candidates fully qualified for appointment as officers, and especially as Midshipmen, in the Royal Naval Reserve continues to exceed the number of vacancies.

The number of Engine-room Artificers qualified and recommended for promotion to Warrant Engineer is more than sufficient to maintain the total establishment of Warrant Engineers required.

Recruiting for the seamen ratings is satisfactory, and no difficulty is anticipated in maintaining the numbers authorised.

Considerable progress has been made with the entry and training of the Trawler Section of the Royal Naval Reserve.

Royal Naval Volunteer Reserve.

The strength of the force is now six divisions, comprising 43 companies, the actual numbers being:—

Royal Naval Volunteers.	Establishment.	Strength, Jan. 1st, 1912.
Officers	190	162
Honorary Officers	—	23
Petty Officers and Men	4,220	3,901
Permanent Staff—		
Officers	7	7
Petty Officers and Men	73	73

The strength of the various divisions is as follows:—

Division.	Establishment.	Strength, Jan. 1st, 1912.
Bristol	310	310
Clyde	1,126	1,018
London	1,024	909
Mersey	718	683
Sussex	616	499
Tyneside	616	614

During the current financial year the following numbers have embarked for training afloat for fourteen or twenty-eight days in fully manned ships of the Home Fleet:—

Officers	41
Petty officers and men	1,076

The following numbers of volunteers qualified for trade certificates

in the Naval ratings shown below during their period of embarkation in 1911 :—

Engine-room Artificers	35
Electricians	2
Shipwrights	4
Blacksmith's Mate	1
Carpenter's crew	9
Painter, 2nd Class	1

Officers and men have also undergone courses at the various schools in gunnery, torpedo, and signalling and telegraphy during the year, and the following have passed and obtained certificates :—

—	Gunnery.	Torpedo.	Signalling and Telegraphy.	Total.
Officers	27	10	—	37
Petty Officers and Men	24	10	7	41

Four medical officers have undergone a fourteen days' course at Haslar Hospital.

The reports on officers and men embarked and under instruction in the schools have been most satisfactory.

The attention paid to instruction of the Royal Naval Volunteer Reserve in signalling continues to show satisfactory results, and there are now 239 volunteers holding the new signal rating in addition to a number of seaman ratings with the signal qualification. These latter, however, will shortly be required either to turn over to the signal branch or to give up their signal qualification.

The appointment of active service signal instructors to certain divisions has had satisfactory results.

Approval has been given for the affiliation of certain Boys' Naval Brigades to Royal Naval Volunteer Reserve divisions, and the regulations governing such affiliations have recently been promulgated. Steps are now being taken to affiliate those brigades which are recommended and satisfy the conditions laid down.

The annual inspections of all the divisions, including outlying companies, have been completed, and show that a general improvement in the efficiency, smartness, and physique of the Royal Naval Volunteer Reserve is being maintained.

The regulations relative to the new system of Surgeons, R.N.V.R., have been issued, and provision has been made for 50 new entrants during the coming financial year.

Greenwich Hospital.

Consequent on the expiration at Michaelmas next of a number of ground leases, several large blocks of property in East Greenwich will shortly come under the immediate control of the Admiralty. The character and condition of much of this property is such as to render a comprehensive project of reconstruction necessary. A scheme has been prepared, and its details, which are estimated to entail a capital expenditure of about £50,000 in the course of the next few years, will be carried out by the Department in the order of their urgency. The revenue from the Greenwich Estate continues to show an increase, and all important premises are let.

Prior to April, 1910, the cost of the naval age pensions of men of the seamen pensioner reserve was, on their attaining 55 years of age, automatically transferred from naval to Greenwich Hospital funds. This transfer is now deferred until the men would obtain an award of the Greenwich Age Pension in the ordinary course of selection, with the result that a substantial sum is set free each year for distribution among older and more necessitous men.

Ordnance.

The manufacture of guns is proceeding at a satisfactory rate, and the authorised reserves of ammunition are fully maintained.

An automatic pistol has been adopted after extensive trials, and a first supply will be made early in the year.

The high standard of shooting in the Fleet has been maintained There have been slight modifications in the conditions, which have tended to make the various practices a more searching test of efficiency, and the results obtained are considered satisfactory.

Other branches of naval ordnance, such as the development of the torpedo and the methods of controlling fire, continue to receive constant and earnest attention, and good progress has been made in the system of communication by wireless telegraphy.

Arrangements have now been completed for carrying out at Sheffield the testing of all ordnance material made by contract for guns and projectiles, thus relieving Woolwich and saving valuable time.

The Torpedo Factory at Woolwich has been finally closed for naval work, and the new factory at Greenock is in full working order.

Works.

Several important items of work have been completed during the year, including the lengthening of the dock at Haulbowline and the torpedo factory at Greenock.

Satisfactory progress has been made with the works in hand, including the naval base at Rosyth and with the new lock and dock at Portsmouth; it has been decided to convert the dock at Portsmouth into a second lock.

The docking accommodation for torpedo-boat destroyers at Pembroke is well advanced, and that at Plymouth is practically finished.

The whole of the works provided for under the item of "Coaling Facilities and Fuel Storage" are completed, with the exception of a few minor services, and good progress is being made with the depôt for submarines at Dover.

W. S.-C.

ADMIRALTY,
4th March, 1912.

APPENDIX TO EXPLANATORY STATEMENT.

NAVAL WAR STAFF.

THE Lords Commissioners of the Admiralty having determined upon the immediate formation of a Naval War Staff, the following Memorandum by the First Lord was published last January in general explanation of the changes involved; also a minute dealing with the appointment of an additional Civil Lord, and a note by the Board of Admiralty dealing with the suppression of the expense of certain establishments.

I.—MEMORANDUM BY THE FIRST LORD ON A NAVAL WAR STAFF.

1. In establishing a War Staff for the Navy, it is necessary to observe the broad differences of character and circumstances which distinguish naval from military problems. War on land varies in every country according to numberless local conditions, and each new theatre, like each separate battle-field, requires a special study. A whole series of intricate arrangements must be thought out and got ready for each particular case; and these are expanded and refined continuously with every increase in the size of the armies, and by every step towards the perfection of military science. The means by which superior forces can be brought to decisive points in good condition and at the right time are no whit less vital, and involve far more elaborate processes, than the strategic choice of those points, or the actual conduct of the fighting. The sea, on the other hand, is all one, and, though ever changing, always the same. Every ship is self-contained and self-propelled. The problems of transport and supply, the infinite peculiarities of topography which are the increasing study of the general staffs of Europe, do not affect the Naval Service except in an occasional and limited degree. The main part of the British Fleet, in sufficient strength to seek a general battle, is always ready to proceed to sea without any mobilisation of reserves as soon as steam is raised. Ships or fleets of ships are capable of free and continuous movement for many days and nights together, and travel at least as far in an hour as an army can march in a day. Every vessel is in instant communication with its fleet and with the Admiralty, and all

can be directed from the ports where they are stationed on any sea points chosen for massing by a short and simple order. Unit efficiency—that is to say, the individual fighting power of each vessel—is in the sea service for considerable periods entirely independent of all external arrangements, and unit efficiency at sea, far more even than on land, is the prime and final factor, without which the combinations of strategy and tactics are only the preliminaries of defeat, but with which even faulty dispositions can be swiftly and decisively retrieved. For these and other similar reasons a Naval War Staff does not require to be designed on the same scale or in the same form as the General Staff of the Army.

2. Naval war is at once more simple and more intense than war on land. The executive action and control of fleet and squadron Commanders is direct and personal in a far stronger degree than that of Generals in the field, especially under modern conditions. The art of handling a great fleet on important occasions with deft and sure judgment is the supreme gift of the Admiral, and practical seamanship must never be displaced from its position as the first qualification of every sailor. The formation of a War Staff does not mean the setting up of new standards of professional merit or the opening of a road of advancement to a different class of officers. The War Staff is to be the means of preparing and training those officers who arrive, or are likely to arrive, by the excellence of their sea service, at stations of high responsibility, for dealing with the more extended problems which await them there. It is to be the means of sifting, developing, and applying the results of history and experience, and of preserving them as a general stock of reasoned opinion available as an aid and as a guide for all who are called upon to determine, in peace or war, the naval policy of the country. It is to be a brain far more comprehensive than that of any single man, however gifted, and tireless and unceasing in its action, applied continuously to the scientific and speculative study of naval strategy and preparation. It is to be an instrument capable of formulating any decision which has been taken, or may be taken, by the executive, in terms of precise and exhaustive detail.

3. It should not be supposed that these functions find no place in Admiralty organisation at the present time. On the contrary, during the course of years, all or nearly all the elements of a War Staff at the Admiralty have been successively evolved in the practical working of every-day affairs, and have been developing since the organisation of the Foreign Intelligence Branch in 1883. The time has now come

to combine these elements into an harmonious and effective organisation, to invest that new body with a significance and influence which it has not hitherto possessed, and to place it in its proper relation to existing power.

4. The government of the Navy has by long usage been exercised by the Board of Admiralty representing the office of Lord High Admiral in commission. There is no need to alter this constitution. which has been respected through centuries of naval supremacy by all ranks in the fleets. The War Staff will, like all other persons in the Admiralty or the Navy, be under the general authority of the Board of Admiralty. It will not interpose any barrier between the Board and the Navy. All the orders which emanate from the Board will continue to be transmitted in the regular manner by the Secretary to those whom they concern.

5. Each of the Sea Lords on the Board of Admiralty has a special sphere of superintendence assigned to him by the First Lord in pursuance of the Order in Council. The First Sea Lord is charged with preparations for war and the distribution of the Fleet. The Second Sea Lord, who is to be kept in close relation to the First Sea Lord, mans the Fleet and trains the men. The Third Sea Lord directs the military construction of the Fleet; and the Fourth Sea Lord is responsible for furnishing it with adequate and suitable stores and ammunition. All these Heads of large departments will have occasion, in the discharge of their respective duties, to recur to the War Staff or its various branches for general information or for working out special inquiries.

6. Since, however, under the distribution of Admiralty business on the Board, the First Sea Lord occupies for certain purposes, especially the daily distribution of the Fleet, on which the safety of the country depends, the position of a Commander-in-Chief of the Navy, with the First Lord immediately over him as the delegate of the Crown in exercising supreme executive power, it follows that the War Staff must work at all times directly under the First Sea Lord. His position is different in important respects from that of the senior member of the Army Council as constituted. The First Sea Lord is an executive officer in active control of daily Fleet movements, who requires, like a general in the field, to have at his disposal a Chief of the Staff, but who is not the Chief of the Staff himself.

7. A proper Staff, whether naval or military, should comprise three main branches, namely, a branch to acquire the information on

which action may be taken; a branch to deliberate on the facts so obtained in relation to the policy of the State, and to report thereupon; and, thirdly, a branch to enable the final decision of superior authority to be put into actual effect. The War Staff at the Admiralty will, in pursuance of this principle, be organised from the existing elements, in three Divisions—the Intelligence Division, the Operations Division, and the Mobilisation Division. These may be shortly described as dealing with War Information, War Plans, and War Arrangements respectively. The Divisions will be equal in status, and each will be under a Director who will usually be a Captain of standing. The three divisions will be combined together under a Chief of the Staff.

8. The Chief of the Staff will be a Flag Officer. He will be primarily responsible to the First Sea Lord, and will work under him as his principal assistant and agent. He will not, however, be the sole channel of communication between the First Sea Lord and the Staff; and the First Lord and the First Sea Lord will whenever convenient consult the Directors of the various Divisions or other officers if necessary. This direction is essential to prevent that group of evils which have always arisen from the "narrow neck of the bottle" system. The Chief of the War Staff will guide and coordinate the work of the Staff in all its branches. He will, when desired, accompany the First Lord and the First Sea Lord to the Committee of Imperial Defence.

9. Although the methodical treatment of the vast number of subjects to be dealt with by the Staff requires that there should be divisions and subdivisions, yet it is imperative that these should never be permitted to develop into water-tight compartments. It will be found that there is so much overlapping between divisions, that a constant, free, and informal intercourse between them is indispensable. To promote this, the Chief of the Staff will be enjoined to hold frequent meetings—to be called "Staff meetings"—with the Heads of the three Divisions, and each of the Directors will be kept fully acquainted with the work of their two colleagues. Each one of the Directors will be ready at any moment to act for the Chief of the Staff in the latter's absence from whatever cause. In times of profound peace, action has often to be taken immediately on the receipt of some telegraphic report, or a request from one of the other Departments of State; one of the three Directors will therefore always remain within prompt call by messenger, night and day.

10. The functions of the War Staff will be advisory. The Chief of the Staff, when decision has been taken upon any proposal, will be jointly responsible with the Secretary for the precise form in which the necessary orders to the Fleet are issued, but the Staff will possess no executive authority. It will discharge no administrative duties. Its responsibilities will end with the tendering of advice and with the accuracy of the facts on which that advice is based.

11. Decision as to accepting or rejecting the advice of the Staff wholly or in part rests with the First Sea Lord, who, in the name of the Board of Admiralty, discharges the duties assigned to him by the Minister. In the absence of the First Sea Lord for any cause the Second Sea Lord would act for him.

12. It is necessary that there should be a close and whole-hearted co-operation between the War Staff at the Admiralty and the General Staff of the Army. A proper connection will also be maintained between the War Staff and the various Departments of State which are involved in the different aspects of its work. It is not necessary to specify further in this Memorandum the distribution of duties which will be made between the various branches of the Staff.

13. The *personnel* of the War Staff must be considerable in numbers, and will consist of naval officers, representing most grades and every specialist branch, fresh from the sea and returning to the sea fairly frequently. Nothing in the constitution of the Staff will be designed to arrest the free play of professional opinion in all its members from top to bottom. Fresh ideas, new suggestions bred by independent study and reflection, may find their proper expression in all ranks. Disciplined co-operation in working out schemes which have been prescribed will not exclude reasoned criticism and original conceptions, the central objects being to form at once a convenient and flexible machine for the elaboration of plans and a school of sound and progressive thought on naval science.

14. The selection and training of the officers to compose a Staff of the nature described is important. Hitherto no special qualifications have been regarded as essential for the officers employed in the Intelligence and Mobilisation Departments, because the ordinary sea training of naval officers was supposed to supply all that was required. This training, however, although admirable on its practical side, affords no instruction in the broader questions of strategy and policy, which become increasingly important year by year. A change

in this respect is therefore considered advisable, and a special course of training at the War College will form an essential part of the new arrangements. The President of the College will be entrusted with this important duty, and, in order that it may be carried out to the best effect, he will at all times be in close touch and association with the Chief of the Staff. In course of time the appointment will be held by a Flag Officer who has been a Staff Officer himself. Candidates for the Staff will be selected from volunteers among Lieutenants of suitable seniority as well as officers of other branches throughout the Service, irrespective of their previous qualifications as specialist officers or otherwise, and those who pass the necessary examinations at the end of or during the War College course will be eligible to receive appointments either at the Admiralty or on the Staff of Flag Officers afloat as they fall vacant. In all cases, however, regular periods of sea-going executive duty will alternate with the other duties of Staff Officers of all ranks, in order that they may be kept up to the necessary standard as practical sea officers. All appointments on sea-going staffs will in the course of time be filled by these officers, and form the proper avenue to eventual employment in the highest Staff positions at the Admiralty.

15. The *personnel* of the Staff as at first established will necessarily consist of officers who will not have received the new Staff training. A certain number of officers with suitable qualifications will therefore be appointed to the Staff at once. These officers, and in the future those who, having successfully graduated in the Staff course at the War College, may be selected for employment, will be constituted as a specialist branch of "Staff Officers," with, in certain cases, special allowances, in the same manner as the officers who have specialised in gunnery, torpedo, and other branches. The organisation to which they belong while serving at the Admiralty will be officially known as the "Admiralty War Staff." The selection and appointment of the officers who will form the Staff on its first establishment will be promulgated at an early date, and their actual work will commence very shortly after.

16. It is hoped that the result of these arrangements will be to secure for the Navy a body of officers afloat and ashore whose aptitudes for staff duties have been systematically trained and developed; and, secondly, to place the First Sea Lord in a position whence he can decide and advise on the grand issues without being burdened with undue detail, and with every assurance that no detail has been neglected.

II.—Minute by the First Lord on the Appointment of an Additional Civil Lord.

1. The special administrative province of the Third Sea Lord and Controller of the Navy is defined by the Order in Council as that of *Matériel*." He is the naval member of the Board of Admiralty whose prime responsibility is to see that the right types of ships are built to carry out the war policy of the Admiralty, and that they are ready at the proper dates. These duties have always been of high consequence and distinction, but in modern times, when the march of naval science leaves the designs of every year behind it, obsolescent as soon as projected, and when naval tactics and naval strategy are being continually modified as a consequence of new inventions and developments in material, the duties of the Third Sea Lord have become so vital that they must engross the undivided attention of that officer. He should have leisure to reflect upon the great and novel issues which are constantly presented, to watch the monthly progress of the vessels that are under construction, and, above all, to visit the fleets themselves, and, by personal observation and practical contact with the working of the latest types, to satisfy himself about the improvements which are possible in future designs. For this his training and expert knowledge as a naval officer of rank have fitted him; and he should be, as far as possible, relieved of routine and administrative functions, and set free to advise the Board upon the supreme subject in his charge.

2. Instead of this, the Controller's Department has in the passage of years, and under the pressure of modern expansions, become the repository of a vast mass of business wholly different and apart from the military construction of the Fleet, and the officer at its head is burdened with an immense number of administrative duties connected with the dockyards, with the finance of an office spending in the present year upwards of £20,000,000, and with the intricate and far-reaching commercial transactions arising out of contracts and purchasing business on a scale probably not equalled in this country. For much of this work the professional experience of an Admiral affords no special knowledge, and naval officers have frequently expressed reluctance to undertake responsibilities so inconsequent and unwieldy. Nothing but the handiness and diligence characteristic of the naval service and the fidelity of the Admiralty staff have enabled this present combination of duties to continue without misadventure.

3. All that may be written of the importance of setting the Third Sea Lord free to direct the military construction of the Fleet applies with no less force, though in a different sphere to the vast business of Admiralty contracts. Here problems of astonishing complexity and of first magnitude arise in a long succession. Many, in fact most of them, are interdependent; and questions like the economic and financial position of particular firms and centres of ship-building, the principles governing a wise and far-seeing distribution of orders, the supply of armour-plate and other special commodities, the most thrifty occasions for making purchases of all kinds, are all seen to be related and to involve a large and continuous commercial diplomacy which, properly conducted, should redound to the advantage of the Navy and the economy of the public service, and which should certainly be the sole and special study of one member of the Board of Admiralty.

4. It is therefore proposed to revive, though for a somewhat different purpose, the office of Additional Civil Lord, which was for a time instituted under Mr. Gladstone's Administration in 1882. The occupant of this post will be a member of the Board of Admiralty. He will be appointed on a fixed tenure. He will be non-parliamentary and non-political. Under him will be placed the various branches of Admiralty departments connected with contracts and purchasing. He will conduct the business and commercial transactions of the Board, and all their relations with the great contracting firms. He will, in short, be the Admiralty buyer and business manager, and it will be his duty to furnish the Third and Fourth Sea Lords with all that they may require in order to build, arm, equip, and supply the Fleet. Except as a member of the Board, he will have no responsibility either for the adequacy of naval preparations, or for the technical suitability of materials ordered. These duties can only be discharged by the Sea Lords responsible for the various departments. It is for them to choose and for him to supply, and these functions, which are sympathetically related, are to be discharged in harmony by both parties, and with full knowledge of each other's spheres.

5. It is not necessary here to enter upon details which require to be elaborated with precision in co-operation with the persons concerned, and which will presently be embodied in a revised Table of Distribution of Business issued by the First Lord under the authority of the Order in Council. The object of this Minute is to explain the general character and intention of the new appointment.

III.—A Note by the Board of Admiralty on the Expense of Certain Establishments.

The Lords Commissioners of the Admiralty have had under consideration the possibility of abolishing certain establishments, the cost of which appear to be out of proportion to the actual advantages accruing therefrom to the Public Service. Their Lordships have therefore carefully enquired into the use made of the various yachts maintained at the cost of the Public Funds, and they have come to the conclusion that certain of them may be dispensed with, either because they have ceased to be of practical use or because the duties which they occasionally perform may equally well be rendered by vessels having a definite value as ships of war. Their Lordships have decided that the three yachts, Undine, Fire Queen, and Vivid, which are at present appropriated to the use of the Commanders-in-Chief at the Home Ports, the Nore, Plymouth, and Devonport, are no longer necessary. These vessels cost respectively in repairs and maintenance in the last financial year £4660, £6990, and £6840. It has been decided to pay them off and sell them as early as may be convenient in the present year.

The particular service vessel Surprise has been detailed for some years as a yacht for the use of the Commander-in-Chief of the Home Fleet. The cost of this vessel during the last completed financial year amounted to £17,860, and involved a withdrawal from their duties of nine officers and upwards of 100 men. The present Commander-in-Chief was informed on succeeding to his command that the continued maintenance of this vessel was under consideration, and their Lordships have now decided that she shall be paid off forthwith. An arrangement will be made whereby a small suitable vessel, now maintained in the Third Division of the Home Fleet, may be made available for the Commander-in-Chief for the purposes of his official duties, but this will involve no additional expense.

Their Lordships consider it right that an additional allowance should be made to the Commanders-in-Chief of the Home Ports in consequence of the abolition of their yachts, which have long been an amenity, and to some extent an emolument, belonging to these posts. It must be remembered that these officers have many claims upon their private purse which are not covered by the table-money, &c., which is allowed them, and it is therefore proposed to obtain an Order in Council to grant each of the three Commanders-in-Chief in question a special allowance of £500 per annum as an increase to his pay from the date from which the yacht ceases to be maintained

for his use, the allowance not to affect half pay or retired pay. The consent of the Treasury has been obtained to this arrangement, the result of which is to secure a net saving of £34,850.

It should be noted that this sum will suffice to meet the additional expense involved in the organisation of the new War Staff, and the appointment of an additional Civil Lord, and will further yield a substantial economy in the public charges.

Directions will be issued accordingly.

ADMIRALTY,
January 1, 1912.

STATEMENT showing the GROSS EXPENDITURE on NAVAL SERVICES for the years 1908–1909 to 1910–1911, together with the ESTIMATED GROSS EXPENDITURE for 1911–1912 and 1912–1913.

—	Actual Expenditure.			Estimated Expenditure.	
	1908-1909.	1909-1910.	1910-1911.	1911-1912.	1912-1913.
	£	£	£	£	£
Gross Expenditure (Navy Vote) (a)	33,827,491	37,385,460	42,441,420	46,204,799	45,949,292
Abate: Annuity under the Naval Works Acts, 1895 to 1905	1,264,033	1,325,809	1,322,752	1,322,752	1,322,752
	32,563,458	36,059,651	41,118,668	44,882,047	44,626,540
Expenditure from Loans	948,262	—	—	—	—
Value of Stores drawn from stock, without replacement, in aid of cash expenditure ...	551,125	155,900	20,750	40,000	66,000
Expenditure on behalf of Naval Services from Votes of other Departments	376,618	383,741	380,413	364,175	382,184
TOTAL	34,439,463	36,599,292	41,519,831	45,286,222	45,074,724

(a) In the years 1909–10 to 1912–13 expenditure on the completion of services originally scheduled in the Naval Works Acts, 1895 to 1905, is provided for entirely under "Gross Expenditure (Navy Votes)."

Abstract of Navy

Votes.		Estimates,	
		Gross Estimate.	Appropriations in Aid.
	I.—NUMBERS.		
A.	Total Number of Officers, Seamen, Boys, Coast-guard, and Royal Marines	136,000	....
	II.—EFFECTIVE SERVICES.	£	£
1	Wages, &c., of Officers, Seamen and Boys, Coast-guard, and Royal Marines	7,801,500	174,500
2	Victualling and Clothing for the Navy	3,359,437	731,337
3	Medical Establishments and Services	289,965	20,065
4	Martial Law	3,600	100
5	Educational Services	218,885	66,385
6	Scientific Services	103,789	31,789
7	Royal Naval Reserves	436,432	9,732
8	Shipbuilding, Repairs, Maintenance, &c.:		
	Section I.—*Personnel*	3,515,800	22,000
	Section II.—*Matériel*	5,457,100	380,300
	Section III.—Contract Work	13,230,600	175,000
9	Naval Armaments	4,064,700	145,700
10	Works, Buildings, and Repairs at Home and Abroad	3,547,000	32,000
11	Miscellaneous Effective Services	545,386	13,386
12	Admiralty Office	437,350	8,850
	Total Effective Services . £	43,011,544	1,811,144
	III.—NON-EFFECTIVE SERVICES.		
13	Half-Pay and Retired Pay	977,212	21,412
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,547,126	30,926
15	Civil Superannuation, Compensation Allowances, and Gratuities	413,410	410
	Total Non-Effective Services . £	2,937,748	52,748
	GRAND TOTAL . £	45,949,292	1,863,892

Provision to the extent of £97,820 is included in the Estimates for 1912–1913 under Votes 8, 10 and 12, for the Acts, 1895 to 1905.

In addition to the Cash expenditure, stocks of Stores purchased in previous years

Estimates for 1912-1913.

1912-1913.	Estimates, 1911-1912.			Difference on Net Estimates.		Votes.
Net Estimate.	Gross Estimate.	Appropriations in Aid.	Net Estimate.	Increase.	Decrease.	
Total Numbers.			Total Numbers.	Numbers.	Numbers.	
136,000	134,000	....	134,000	2,000	....	A.
£	£	£	£	£	£	
7,627,000	7,703,000	191,500	7,511,500	115,500	....	1
2,628,100	3,233,942	615,142	2,618,800	9,300	....	2
269,900	289,787	18,887	270,900	....	1,000	3
3,500	4,000	100	3,900	....	400	4
152,500	215,363	64,863	150,500	2,000	....	5
72,000	99,818	27,818	72,000	....	....	6
426,700	397,768	9,768	388,000	38,700	....	7
						8
3,493,800	3,563,500	22,000	3,541,500	....	47,700	Sec. I.
5,076,800	5,432,900	477,500	4,955,400	121,400	....	Sec. II.
13,055,600	14,539,300	174,000	14,365,300	....	1,309,700	Sec. III
3,919,000	3,827,400	106,400	3,721,000	198,000	....	9
3,515,000	3,095,300	30,000	3,065,300	449,700	....	10
532,000	547,339	15,339	532,000	....	....	11
428,500	415,250	8,850	406,400	22,100	....	12
41,200,400	43,364,667	1,762,167	41,602,500	956,700	1,358,800	
955,800	945,111	18,841	926,300	29,500	....	13
1,516,200	1,499,121	30,921	1,468,200	48,000	....	14
413,000	395,870	370	395,500	17,500	....	15
2,885,000	2,840,132	50,132	2,790,000	95,000	....	
44,085,400	46,204,799	1,812,299	44,392,500	1,051,700	1,358,800	

Net Decrease £307,100

continuation of services originally provided for out of funds raised under the authority of the Naval Works will be drawn upon without replacement to the extent of £66,000 (estimated).

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1911–1912 and those for 1912–1913.

DECREASES.		£
Wages of Artificers in Dockyards		56,098
Naval Stores for the Fleet		93.350
Propelling Machinery for His Majesty's Ships and Vessels (Contract)		208,093
Hulls of Ships (Contract)		896,163
Repairs and Alterations by Contract of Ships, &c.		45,000
Gun Mountings and Air-Compressing Machinery (Contract)		186,527
Machinery for His Majesty's Shore Establishments (Contract)		80,000
£		1,565,231
INCREASES.	£	
Wages, &c., of Officers, Seamen and Marines	98,500	
Victualling and Clothing for the Navy	4,000	
Educational Services	2,000	
Royal Naval Reserves	40,300	
Fuel, &c., for the Fleet	123,500	
Decrease in Amount of Receipts arising from the Sale of Ships	77,500	
Auxiliary Machinery, &c., for His Majesty's Ships and Vessels (Contract)	2,038	
Armour for His Majesty's Ships and Vessels (Contract)	93,345	
Inspection of Contract Work	14,000	
Naval Ordnance Establishments, and Naval Ordnance Stores.	195,500	
Works, Buildings, and Repairs	449,700	
Non-Effective Services	90,000	
Miscellaneous Increases	23,248	
Decrease in Amount of Repayment from the Government of India on account of Services rendered by His Majesty's Ships engaged in the Suppression of the Arms Traffic in the Persian Gulf	44,500	
		1,258,131
Net Decrease £		307,100

STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services :—

—		1912–1913.	1911–1912.
		£	£
NAVY ESTIMATES:			
Estimated Expenditure (after deducting Appropriations in Aid)		44,085,400	44,392,500
CIVIL SERVICE ESTIMATES: (a)			
Estimated Expenditure under—			
Class I. Vote 10.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c.	10,750		
Rents, Insurance, Tithes, &c.	2,290		
Fuel, Light, Water, &c.	6,000		
Furniture	3,500		
		22,540	25,670
Class I. Vote 11.—Surveys of the United Kingdom		4,500	4,690
„ I. „ 14.—Rates on Government Property		149,000	142,500
„ I. „ 15.—Public Works and Buildings, Ireland:			
Coast-guard, viz.:	£		
Purchase of Sites	—		
New Works and Alterations, including Naval Reserve Stations	6,970		
Maintenance and Supplies	4,219		
Naval Reserve, viz.:			
Maintenance and Supplies	31		
		11,220	7,930
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,294	3,460
„ II. „ 9.—Mercantile Marine Services:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		2,500	2,500
„ II. „ 13.—Government Chemist:			
Analysis of Food, &c.		400	400
„ II. „ 15.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts	5,907		
Expense and Manufacturing Accounts	4,176		
Store Accounts	4,556		
		14,639	21,324
Class II. Vote 24.—Stationery and Printing		118,000	103,000
„ III. „ 1.—Law Charges, England		11,477	10,966
Maintenance of Naval Prisoners:			
„ III. „ 8.—Prisons, England and the Colonies		630	720
„ III. „ 14.—Prisons, Scotland		300	300
„ III. „ 21.—Prisons, Ireland		397	382
REVENUE DEPARTMENT ESTIMATES:			
Vote 1.—Customs and Excise.—Percentage for provision of funds for District Paymasters of the Coast-guard, &c.		297	303
Vote 1.—Customs and Excise.—Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,300	3,300
Vote 3.—Post Office		39,690	36,730
Total	£	44,467,584	44,756,675

Note.—In addition to the Services shown above, an annuity of £16,243 18s. is payable to the Commissioners of Woods, &c., from the Consolidated Fund, under the Public Offices Sites Act of 1882 (45 & 46 Vict. c. 32).

(*a*) Provision is also made in the Estimate for Osborne (Class I., Vote 2) for expenditure in connection with the treatment of Invalid Officers of the Navy in the Convalescent Home at Osborne, and in the Vote for Public Buildings, Great Britain (Class I., Vote 10) for Annuities in repayment of sums advanced for sites and buildings under various Acts.

STATEMENT showing the CONTRIBUTIONS from INDIA and the COLONIES towards NAVAL EXPENDITURE.

RECEIVED FROM.	NATURE OF SERVICE.	VOTE.															TOTAL.
		1	2	3	6	7	8			9	11	12	13	14	15	
							Section I.	Section II.	Section III.							
India	Maintenance of His Majesty's Ships in Indian Waters	£ 28,000	£ 9,100	£ 500	£ ..	£ ..	£ 12,500	£ 10,200	£ 13,000	£ 11,600	£ 2,500	£ ..	£ 4,300	£ 8,300	£ ..	£ 100,000
India	Indian Troop Service (on account of work performed by the Admiralty)	..	..	..	..	..	..	..	..	..	..	3,050	..	..	350	3,400
India	Repayment on account of services rendered by His Majesty's Ships engaged in the suppression of the Arms Traffic in the Persian Gulf	25,000	6,300	100	..	..	..	16,850	4,800	3,400	500	..	2,200	4,850	..	64,000
Australian Commonwealth Dominion of Canada	Contributions on account of liability for Retired Pay of Officers and Pensions of Men lent from the Royal Navy	..	..	..	..	..	..	..	..	..	..	..	4,200	3,380	..	7,580

Australian Commonwealth	Survey of the N.-W. coast of Australia .	3,900	1,300	..	550	..	200	1,550	..	..	..	..	..	..	..	7,500
Australian Commonwealth Dominion of New Zealand	Maintenance of an Australasian Squadron and the establishment of a branch of the Royal Naval Reserve . . . . Maintenance of an Australasian Squadron and of the Imperial Navy generally, also for the establishment of a branch of the Royal Naval Reserve	72,500	22,900	700	..	6,300	..	38,400	118,700	6,900	8,700	..	10,600	14,300	..	200,000 100,000
Cape Colony . .	General maintenance of the Navy . .	11,100	4,600	..	..	..	4,900	9,100	14,100	6,200	..	..	..	..	..	50,000
Natal		7,700	3,200	..	..	..	3,400	6,400	9,900	4,400	..	..	..	..	..	35,000
Newfoundland .	Maintenance of a branch of the Royal Naval Reserve . .	..	..	..	..	3,000	..	..	..	..	..	..	..	..	..	3,000
	Total . .	£ 148,200	47,400	1,300	550	9,300	21,000	82,500	160,500	32,500	11,700	3,050	21,300	30,830	350	570,480

VOTE (A).

NUMBERS of Officers, Seamen and Boys, Coast-guard, and Royal Marines Borne on the Books of His Majesty's Ships, and at the Royal Marine Divisions.

One Hundred and Thirty-six Thousand.
(136,000.*)

I.—Sea Service.

Under which Vote Provided.	Ranks, &c.	Numbers, all Ranks. 1912–1913.		1911–1912.		Numbers of all Ranks borne on 1st January, 1912.
Vote 1	For His Majesty's Fleet:					
	Flag Officers	28		26		
	Commissioned Officers	4,727		4,692		
	Subordinate Officers	740		736		
	Warrant Officers	2,070		1,960		
	Petty Officers and Seamen	97,811		96,670		
	Boys (Service)	2,601	107,977	2,161	106,245	105,879
	Coast-guard:					
	Commissioned Officers	99		102		
	Chief Officers and Second Mates	205		208		
	Petty Officers and Seamen	2,796	3,100	2,790	3,100	3,027
	Royal Marines (for Service Afloat and on Shore):					
	Commissioned Officers	420		425		
	Warrant Officers	67		58		
	Staff Sergeants and Sergeants	1,300		1,299		
	Band Ranks, Buglers and Musicians	1,708		1,641		
	Rank and File	13,296		13,296		
	Band Boys	272	(a) 17,063	241	16,960	16,983
	Total		128,140		126,305	125,889

Net Increase 1,835

* Average for the year.

(a) Including 30 Officers, &c., Sub-Heads F and H.

VOTE (A)—*continued.*

II.—OTHER SERVICES.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1912-1913.		1911-1912.		Numbers of all Ranks borne on 1st January, 1912.
Vote 1	Naval Cadets	820		805		
	Pensioners in Home Ships, &c.	299		287		
	Boys under Training—					
	Seaman Class	4,281		4,340		
	Artificer Class	596	(*b*) 5,996	572	6,004	5,731
Vote 2	For Victualling and Clothing for the Navy	7		7		
Vote 3	For Medical Establishments and Services	769		607		
Vote 5	For Educational Services	552		551		
Vote 6	For Scientific Services	3		3		
Vote 7	For Royal Naval Reserves	63		60		
Vote 8	For Shipbuilding, Repairs, Maintenance, &c.:					
	Section I.	245		221		
	Section II.	15		29		
	Section III.	90		96		
Vote 9	For Naval Armaments	81		81		
Vote 12	For Admiralty Office	39	1,864	36	1,691	1,692
	Total		(*c*) 7,860		7,695	7,423
	Net Increase		165			

Total, Sea Service	128,140		126,305	
,, other Services	7,860	136,000	7,695	134,000
Net Increase		2,000		

(*b*) Including 16 Officers, Sub-Head II.

(*c*) Including Officers, Seamen and Service Boys	2,483	..	2,301
,, Retired Officers and Pensioners (Vote 1)	299	..	287
,, Boys (Training, Seaman Class)	4,281	..	4,340
,, Boys (Training, Artificer)	596	..	572
,, Boys (Training, Artisan)	64	..	56
,, Royal Marines	137	..	139
	7,860	..	7,695

VOTE 8.

SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1913, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—Three Million Four Hundred and Ninety-three Thousand Eight Hundred Pounds.

(£3,493,800.)

SECTION II.—MATÉRIEL.—Five Million and Seventy-six Thousand Eight Hundred Pounds

(£5,076,800.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Thirteen Million and Fifty-five Thousand Six Hundred Pounds.

(£13,055,600.)

(Total of the Three Sections of Vote 8 . . **£21,626,200.**)

II.—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

DOCKYARD WORK. SECTION I.—PERSONNEL.	ESTIMATES. 1912–1913.	ESTIMATES. 1911–1912.	Increase.	Decrease.
Dockyards at Home.	£	£	£	£
A.—Salaries and Allowances	(a) 248,437	245,328	3,109	..
B.—Wages, &c., of Men, and hire of Teams	2,647,764	2,707,303	..	59,539
C.—Wages, &c., of Police Force . .	59,689	55,825	3,864	..
D.—Contingencies	3,700	2,900	800	..
Naval Yards Abroad.				
E.—Salaries and Allowances	(a) 113,335	112,695	640	..
F.—Wages, &c., of Men, and hire of Teams	420,885	417,444	3,441	..
G.—Wages, &c., of Police Force . .	21,340	21,355	..	15
H.—Contingencies	650	650	..	..
£	3,515,800	3,563,500	11,854	59,554
Deduct,— I.—Appropriations in Aid	22,000	22,000	..	..
£	3,493,800	3,541,500	11,854	59,554
		Net Decrease	. £47,700 (*b*)	

(*a*) These amounts include the sums of £39,661 for pay of Inspectors of Trades and Senior Draughtsmen at Home and £15,365 for pay of Inspectors of Trades Abroad, which is charged direct to the cost of shipbuilding, *see* Programme.

(*b*) This Vote is increased by a sum of £120 in respect of Dockyard Labour on Fixed Machinery originally provided for by advances under the Naval Works Acts, 1895 to 1905.

Note.—Provision has been made for New Construction in the above Vote to the extent of—

Section 1	£942,175
„ 2	647,175
„ 3	12 382,177
	£13,971,527

The difference (£142,979) between the provision under Section III. of the Vote (£12,382,177) and the amount shown in the Programme (£12,239,198) is due to the estimated withdrawals from Stock of transferable auxiliary machinery, gun mountings and steamboats during the year being less than the cash payments for like articles brought into Stock in the same period.

In addition to the Cash Vote of £5,076,800 under Section II., stocks of Naval Stores purchased in previous years will be drawn upon without replacement during 1912–1913 to the extent of £66,000.

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION II., MATÉRIEL, of this VOTE will be accounted for.

——	ESTIMATES. 1912-1913.	ESTIMATES. 1911-1912.	Increase.	Decrease.
DOCKYARD WORK—*continued.*				
SECTION II.—MATÉRIEL.				
Naval Stores, &c.	£	£	£	£
A.—Timber, Masts, Deals, &c.	208,700	209,000	..	300
B.—Metals and Metal Articles	1,034,800	1,117,600	..	82,800
C.—Coal for Yard purposes	120,000	137,000	..	17,000
D.—Hemp, Canvas, &c.	208,000	210,000	..	2,000
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles	708,000	743,000	..	35,000
F.—Electrical, Torpedo, and other Apparatus	516,000	483,500	32,500	..
G.—Freight	55,000	50,000	5,000	..
H.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad	41,000	39,800	1,200	..
I.—Gas and Electric Current, Dockyards at Home and Naval Yards Abroad	13,100	14,000	..	900
£	2,904,600	3,003,900	38,700	138,000
Deduct,—				
J.—Appropriations in Aid.	339,300	436,500	..	97,200
£	2,565,300	2,567,400	38,700	40,800
Fuel, &c., for the Fleet.				
K. I.—Fuel, Lubricating Oils, &c., for the Fleet	2,168,500	2,097,500	71,000	..
K. II.—New Craft and Machinery for Coaling, &c.	136,000	103,000	33,000	..
K. III.—Salaries, Wages, and Allowances	139,000	126,000	13,000	..
K. IV.—Maintenance of Craft for Coaling, &c., and incidental expenses	109,000	102,500	6,500	..
£	2,552,500	2,429,000	123,500	..
Deduct,—				
L.—Appropriations in Aid	41,000	41,000	..	..
£	2,511,500	2,388,000	123,500	..
£	5,076,800	4,955,400	162,200	40,800
	Net Increase		£121,400(*a*)	

(*a*) This Vote is increased by a sum of £500 under Naval Stores in respect of Fixed Machinery originally provided for by advances under the Naval Works Acts, 1895 to 1905.

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

——	ESTIMATES. 1912–1913.	ESTIMATES. 1911–1912.	Increase.	Decrease.
SECTION III.—CONTRACT WORK.	£	£	£	£
A.—Propelling, &c., Machinery for His Majesty's Ships, Vessels, &c.	4,017,308	4,225,401	..	208,093
B.—Auxiliary Machinery, &c., for His Majesty's Ships, Vessels, &c.	105,000	102,962	2,038	..
C.—Hulls of Ships, &c., Building by Contract	3,411,057	4,307,220	..	896,163
D.—Armour for His Majesty's Ships and Vessels	2,576,152	2,482,807	93,345	..
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	100,000	145,000	..	45,000
F.—Inspection of Contract Work	124,000	110,000	14,000	..
G.—Gun Mountings and Air-Compressing Machinery	2,384,383	2,570,910	..	186,527
H.—Machinery, &c., for His Majesty's Shore Establishments at Home and Abroad	337,000	400,000	..	63,000
H.H.—Fixed Machinery, formerly provided for by Advances under the Naval Works Acts, 1895 to 1905	8,000	25,000	..	17,000
I.—Royal Reserve of Merchant Cruisers	150,000	150,000	..	..
K.—Purchase of Ships, Vessels, &c.	17,700	20,000	..	2,300
£	13,230,600	14,539,300	109,383	1,418,083
Deduct,—				
L.—Appropriations in Aid	175,000	174,000	1,000	..
£	13,055,600	14,365,300	108,383	1,418,083
	Net Decrease .		£1,309,700 (*a*)	

(*a*) This Vote is increased by a sum of £8000 (Sub-Head H.H.) in respect of Fixed Machinery originally provided for by advances under the Naval Works Acts, 1895 to 1905.

VOTE 9.

NAVAL ARMAMENTS.

I.—ESTIMATE of the SUM which will be required in the Year ending 31st March, 1913, to defray the Expense of NAVAL ARMAMENTS.

Three Million Nine Hundred and Nineteen Thousand Pounds.
(£3,919,000.)

II.—SUB-HEADS under which this Vote will be accounted for.

	ESTIMATES. 1912–1913.	ESTIMATES. 1911–1912.	Increase.	Decrease.
NAVAL ORDNANCE, &c., ESTABLISHMENTS AT HOME AND ABROAD.	£	£	£	£
A.—Salaries and Allowances	57,836	54,840	2,996	..
B.—Wages of Artificers, &c.	344,700	341,700	3,000	..
C.—Wages of Crews of Naval Ordnance Vessels	12,700	12,200	500	..
D.—Wages, &c., of Police Force	33,200	29,000	4,200	..
E.—Medical Attendance, Rents, Water, Gas, &c., and Contingencies	16,394	16,760	..	366
NAVAL ORDNANCE STORES.				
F.—Guns	1,081,500	1,160,000	..	78,500
G.—Projectiles and Ammunition	1,480,500	1,210,000	270,500	..
H.—Torpedoes and Gun-cotton	334,500	308,600	25,900	..
I.—Small Arms, Torpedo Materials, Maintenance of Vessels, and Miscellaneous	413,370	428,000	..	14,630
K.—Inspection, Proof, Experiments, &c.	265,000	245,000	20,000	..
L.—Freight and Incidental Charges	25,000	21,300	3,700	..
£	4,064,700	3,827,400	330,796	93,496
Deduct,— M.—Appropriations in Aid	145,700	106,400	39,300	..
£	3,919,000	3,721,000	291,496	93,496
		Net Increase	£198,000	

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET MAINTENANCE, &c., in (Exclusive of the FLEET

SUB-HEADS under which this ESTIMATED EXPENDITURE will be provisions of Section 1 (2), ARMY

	ESTIMATED EXPENDITURE IN				
	Direct Expenditure.				
	Dockyard Work.		Contract Work, Sec. III.	Total Direct Expenditure. (A)	
	Personnel, Sec. I.	Matériel, Sec. II.			
NEW CONSTRUCTION:	£	£	£	£	
A.—DOCKYARD-BUILT SHIPS—					
Hulls, &c. (*c*)	825,985	537,320	(*f*) 2,026,167	3,389,472	1
Machinery	72,585	27,465	739,874	839,924	2
	898,570	**564,785**	**2,766,041**	**4,229,396**	**3**
B.—CONTRACT-BUILT SHIPS—					
Hulls, &c. (*c*)	42,805	90,960	(*g*) 6,003,910	6,137,675	**4**
Machinery	..	*Cr.* *10,420*	3,165,915	3,155,495	**5**
	42,805	**80,540**	**9,169,825**	**9,293,170**	**6**
C.—OTHER VESSELS, &c. (*d*) . .	800	1,850	303,332	305,982	7
TOTAL NEW CONSTRUCTION	**942,175**	**647,175**	**12,239,198**	(*e*) **13,828,548**	8
D.—REPAIRS, ALTERATIONS, &c. .	1,506,500	742,650	231,543	2,480,693	9
E.—STORES, FOR MAINTENANCE, &c.	..	1,027,500	..	1,027,500	10
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED .	..	..	..	..	11
TOTAL . . . £	**2,448,675**	**2,417,325**	**12,470,741**	**17,336,741**	12

(c) Including Hydraulic and Transferable Gun Mountings, &c.
(*d*) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under other Sub-Heads.
(*e*) Exclusive of £1,800 provided under Vote 2 for new Lighters for Victualling Yard Service, £39,200 provided under Vote 9 for New Vessels for Naval Ordnance Store Service and £122,000 for Coaling Craft, Vote 8, Section 2, Sub-Head K.
(*f*) Including £1,077,736 for Armour. (*g*) Including £1,488,416 for Armour.

VALUES OF STORES issued for SHIPBUILDING, REPAIRS, ALTERATIONS,
the Year 1912–1913.
COALING SERVICE.)

accounted for in the NAVY EXPENSE ACCOUNTS, under the
AND NAVY AUDIT ACT, 1889.

	1912–1913.		EXPENDITURE AS ESTIMATED IN NAVY ESTIMATES, 1911–1912.			Difference between Direct Expenditure, 1911–1912 (B) and 1912–1913 (A).	
	Establishment, &c., Charges, apportioned.	Aggregate, 1912–1913.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1911–1912.	Increase.	Decrease.
	£	£	£	£	£	£	£
1	258,010	3,647,482	(h) 3,206,101	228,746	3,434,847	183,371	..
2	29,868	869,792	951,961	27,168	979,129	..	112,037
3	**287,878**	**4,517,274**	**4,158,062**	**255,914**	**4,413,976**	**71,334**	..
4	116,036	6,253,711	(i) 7,235,041	112,796	7,347,837	..	1,097,366
5	53,448	3,208,943	3,113,089	44,696	3,157,785	42,406	..
6	**169,484**	**9,462,654**	**10,348,130**	**157,492**	**10,505,622**	..	**1,054,960**
7	5,388	311,370	550,493	8,497	558,990	..	244,511
8	**462,750**	**14,291,298**	**15,056,685**	**421,903**	**15,478,588**	..	**1,228,137**
9	325,462	2,806,155	2,797,328	331,899	3,129,227	..	316,635
10	94,678	1,122,178	1,056,300	88,174	1,144,471	..	28,800
	882,890			841,976			
11	3,026,641	3,026,641	..	2,802,101	2,802,101	..	
12	**3,909,531**	**21,246,272**	**18,910,313**	**3,644,077**	**22,554,390**	..	..

NET DECREASE ON DIRECT EXPENDITURE **£1,573,572**

(h) Including £952,500 for Armour.
(i) Including £1,520,307 for Armour.

LIST of NEW SHIPS and VESSELS Estimated to be Passed into COMMISSION during the Years 1912–1913 and 1911–1912.

1912–1913.

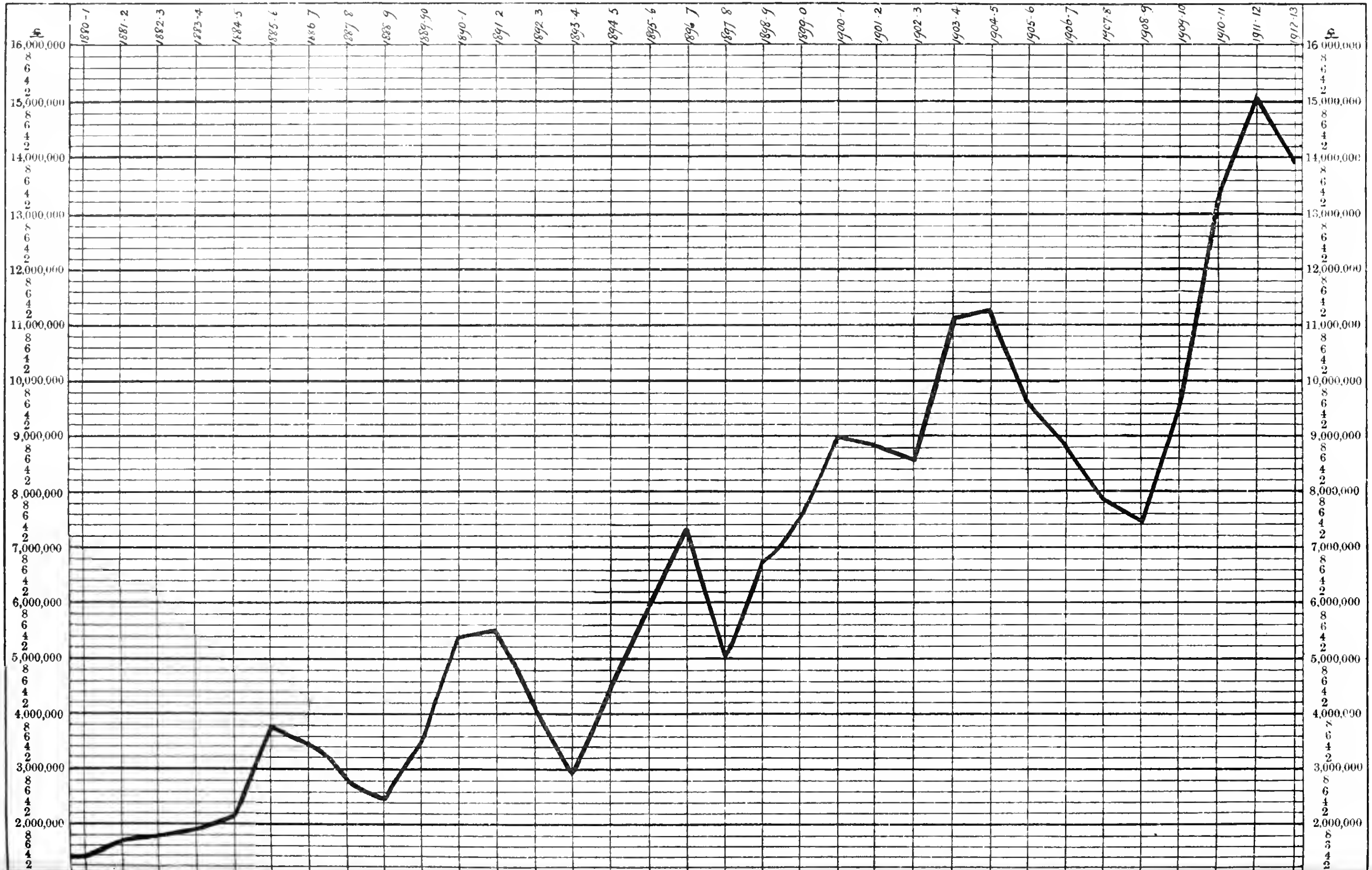
Name of Ship.	Load Displacement in Tons.	Estimated Horse Power.	Number of Guns.
ARMOURED SHIPS.			
King George V.	..	..	..
Centurion	..	..	..
Thunderer	22,500 (e)	27,000	10
Conqueror	22,500 (e)	27,000	10
Ajax	..	..	.
Lion	26,350 (e)	70,000	8
Princess Royal	26,350 (e)	70,000	8
Queen Mary	..	..	..
UNARMOURED SHIPS.			
Dublin	5,400	22,000	8
Southampton	5,400	22,000	8
Chatham	5,400	22,000	8
Amphion	3,440	18,000	10
TORPEDO CRAFT.			
Torpedo Boat Destroyers 24	..	Various	..
Submarine Boats 6	..	..	..
MISCELLANEOUS.			
Maidstone	3,600	2,800	..
Woolwich	..	..	..
Endeavour	1,280	1,100	..
Alecto	935	1,400	..
Kingfisher	..	..	..
Rail	..	..	..

1911–1912.

Name of Ship.	Load Displacement in Tons.	Estimated Horse Power.	Number of Guns.
ARMOURED SHIPS.			
Hercules	20,000 (e)	25,000	10
Colossus	20,000 (e)	25,000	10
Orion	22,500 (e)	27,000	10
Monarch	22,500 (e)	27,000	10
UNARMOURED SHIPS.			
Dartmouth	5,250	22,000	8
Falmouth	5,250	22,000	8
Weymouth	5,250	22,000	8
Yarmouth	5,250	22,000	8
Blonde	3,350	18,000	10
Active	3,440	18,000	10
TORPEDO CRAFT.			
Torpedo Boat Destroyers 20	..	Various	..
Submarine Boats 5	..	..	..
MISCELLANEOUS.			
Adamant	935	1,400	..
Watchful	600	800	..
Daisy	..	..	..
Esther	..	..	..

(e) Estimated.

DIAGRAM SHEWING THE EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS DURING THE 33 YEARS BETWEEN 1880-81 & 1912-13.



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RECAPITULATION OF ESTIMATED EXPENDITURE.

SUB-HEADS OF EXPENDITURE.	Total Direct Expenditure.	Establishment, etc., Charges Apportioned.	New Construction.	Repairs, Alterations, etc.			Sea Stores, etc.	Establishment, Incidental, and Miscellaneous Charges Unappropriated.		Aggregate, 1912–13.
				Ships for Reliefs or Re-commission.	Ships in Commission and Reserve.	Other Naval Services.				
DOCKYARD WORK:	£	£	£	£	£	£	£	£	£	£
Section I.—*Personnel* .	2,448,675	1,271,090	1,084,331	366,981	1,257,928	70,192	63,545	380,896	495,892	3,719,765
Section II.—*Matériel* .	2,417,325	1,906,839	758,313	220,103	599,907	57,355	1,058,633	674,574	1,258,459	4,324,164
CONTRACT WORK:										
Section III. . .	12,470,741	731,602	12,448,654	26,535	165,027	42,127	..	32,000	184,820	13,202,343
Total Estimated Expenditure for 1912–1913	17,336,741	3,909,531	14,291,298	613,619	2,022,862	169,674	1,122,178	1,087,470	1,939,171	21,246,272
Totals of Sub-Heads £	21,246,272		14,291,298	2,806,155			1,122,178	3,026,641		21,246,272

FIRST LORD'S SPEECH.*

On introducing the Navy Estimates in the House of Commons, March 18th, Mr. Churchill said:—The foundation of naval policy is Finance, and the only credit that can be claimed by the Board of Admiralty is for keeping the requirements of the Navy at a *minimum* consistent with public safety and for securing the utmost possible development of war power from the funds entrusted to them. If the country is of opinion that the needs of the Navy have been well and amply provided for, it is to the House of Commons and not to the Board of Admiralty, and to the Chancellor of the Exchequer and not to the First Lord, that their thanks and gratitude are due. It is necessary that this should be recognised, and it is right for me to say at this point that the great scale which our naval armaments have been forced to assume has only been rendered possible without additional taxation or recourse to borrowing by the wonderful fertility of the great Budget of 1909, for which my right hon. friend the Chancellor of the Exchequer will be long and variously remembered and increasingly respected. The financial aspect of the Naval Estimates is not cheerful. All the world is building navies, and everything connected with every navy is constantly increasing in size, complexity, and cost. Naval finance cannot be conveniently studied on the basis of a single year. Annual Estimates, however useful they may be for certain purposes of Parliamentary control, do not give the House of Commons a fair chance of understanding or of measuring naval expenditure. Capital ships affect the Estimates of three successive years. The Estimates I present to-day are almost entirely governed by what was settled last year and the year before, and the Estimates and war strength of two years hence will be mainly decided by what is determined this year by the House of Commons. So far as possible I have tried to look ahead, and the effect of every measure to which I shall refer to-day has been and is being worked out on the various Votes for three, four, and five years ahead. It may be, though of course I do not make any pledge on the point, that during the course of the present year we shall find ourselves able so far to forecast future naval finance as to be able to present in the House of Commons next year the Estimates not of one year but of a series of years.

* Reprinted from *The Times*, and revised where necessary according to the Official Report.

For the present, however, my study of this immense business does not enable me to go beyond certain general indications in regard to prospective finance, which are given and will, I trust, be taken strictly without prejudice. Owing principally to labour troubles which have involved delays in shipbuilding, there has been an under-spending on the Votes for shipbuilding, repairs, and maintenance of £1,600,000. The bulk of that sum has to be at once surrendered to the Exchequer, although the liability to meet which it was voted for Parliament still continues. In consequence the Estimates of 1912–13 are artificially inflated by £600,000 and those of 1913–14 by about £1,000,000. It has been found necessary, with Treasury sanction, to dispose of £300,000 of this under-spending so as to provide for certain urgent services, and this has had the effect of relieving by that amount the Estimates of 1912–13. The extra burden on the Estimates of 1913–14 is, however, irremediable.

Bringing Expenditure Forward.

Since it is most desirable both for home and foreign services that Naval Estimates should, if possible, exhibit a continuous downward tendency, apart from measures consequent upon new increases abroad, I have endeavoured to bring as much expenditure forward into the year 1912–13 as possible in order to lighten the burden of succeeding years. A rather larger proportion than usual of the new programme is to be taken in hand during 1912–13, and all reserves of guns, ammunition, and torpedoes are to be brought up to their full level. These measures, which are justifiable, and even necessary, on other grounds, will, I hope, have the effect of securing for Votes 8 and 9—the two principal index Votes on naval finance—a continuous decline, aggregating in the three years in prospect about £2,300,000. This diminution would continue to the extent of another £300,000 if the survey were extended two years further. The progressive reduction and improvement in Votes 8 and 9 will be very largely counteracted by the growth of automatic and uncontrollable charges, charges which accrue on Votes other than Votes 8, 9 and 10. The Accountant-General estimates that even if no addition to numbers were necessary beyond the 135,000 expected to be borne on March 31, 1912, there would be an increase through the mere maturing of obligations which the State has already contracted in pay, allowances, pensions, &c., of £250,000 in 1912–13, and an additional £415,000 in 1913–14. If the numbers increase at the rate of 2000 a year—which is the lowest possible increase which can be contemplated on the basis of the programme of other countries remaining as they are now disclosed, then the automatic augmentation

of the Votes over which the Accountant-General presides would in the five years I am taking into consideration amount to £1,700,000.

Sources of Increased Expenditure.

The second source of certain and uncontrollable increase lies in the consumption of fuel—coal and oil. That is due to the rapidly increasing horse-power of the Fleet. Ships are joining the Navy of 70,000 horse-power, and of course they consume for an equal amount of movement a greater quantity of fuel than the vessels of from 15,000 to 20,000 horse-power which they replace. The increase due to the automatic augmentation of coal and oil consumption will not be less in the next five years than about £900,000 a year. Thirdly, there is the ever-increasing size and cost of ships of all types and classes, necessitating larger docks, wider dock entrances, and more complicated and extensive repairing plant. Lastly, there is the ordinary labour pressure in the dockyards and the general advance in prices. The House will see that the relief we may expect on one set of charges is likely, on the figures I have adduced, to be very largely neutralized by automatic increases upon other portions of the Estimates. The requirements of 1912–13, after all possible reductions have been made, including relief by expenditure of the surplus in 1911–12, present the following principal features:—An increase of *personnel* of 2000, an increase in the pay, non-effective pay, and other automatic charges of £280,000, an increase in the cost of fuel of £125,000, an increase in the Votes for armaments and ammunition of £200,000, and an increase of the expenditure upon works due only to the execution of existing contracts at Rosyth and Crombie of £450,000, making a total increase of £1,055,000, against which I have been able to show a reduction of about £1,100,000 in new construction and about £250,000 on other services under Vote 8. The nominal net decrease, therefore, upon the Estimates is just over £300,000 and the true decrease is £600,000.

Germany and the Naval Situation.

I propose, with the permission of the House, to lay bare to them this afternoon with perfect openness, the naval situation. It is necessary to do so mainly with reference to one Power. I regret that necessity, but nothing is to be gained by using indirect modes of expression. On the contrary, the Germans are a people of robust mind, whose strong and masculine sense and high courage do not recoil from, and are not offended by, plain and blunt statements of fact if expressed with courtesy and sincerity. Anyhow, I must discharge my duty to the House and the country. The time has come

when both nations ought to understand, without ill-temper or disguise, what will be the conditions under which naval competition will be carried on during the next few years. The cost and strength of a navy depend upon two main things; first of all, there is the establishment of ships and men, maintained in the various scales of commission, and secondly the rate and amount of new construction by which the existing fleets are renewed or augmented. The increase in the establishment of great navies like the British and the German Navies does not involve such heavy additions to the annual expenditure as the increase in new construction. On the other hand, the cost of increases in new construction is confined to the years in which it takes place and comes to an end with the completion of the ships; while increases in the number of men, although comparatively small so far as the cost in one year is concerned, involve charges in pay and pensions which recur year after year for a whole generation. Increases in new construction mean increased strength for fighting through having better military plant. Increases in establishment mean increased readiness for fighting through being better organised and better trained. It will be convenient for the House to bear these distinctions in mind.

The Fighting Value of pre-Dreadnoughts.

Before I discuss the actual standard of new construction which we should look to as our guide in the next few years, there are three general observations which I shall venture to make. The first is that in times of peace we measure the relative naval construction of two navies by percentages, and that is, perhaps, as good a way as any other. In naval war, and especially in modern naval war, another system of calculation becomes dominant. Battles are not decided by ratios or percentages. They yield definite and absolute results, and the strength of conflicting navies ought to be measured, and is measured, not as in peace by comparison, but by subtraction. We must expect that in a fleet battle between good and efficient navies, equally matched, tremendous damage will be reciprocally inflicted. Many ships on both sides will be sunk or blown up. Many more will sustain injuries which will take months to repair. Others, again, will not come out during the whole of the war. Indeed, the more we force ourselves to picture the hideous course of a modern naval engagement, the more one is inclined to believe that it will resemble the contest between Mamilius and Herminius at the Battle of Lake Regillus, or the still more homely conflict of the Kilkenny cats. That is a very satisfactory reflection for the stronger naval Power. It will always pay the stronger naval Power to

lose ship for ship in every class. The process of cancelling would conduct us, albeit by a ghastly road, to certain victory and a condition, not of relative but of absolute superiority. Further, with a reciprocal destruction of the newer ships, the older vessels will rise swiftly in value; when the ace is out the king is the best card, and so on. We possess more Dreadnoughts than any other two Powers in the world to-day, and if all the Dreadnoughts in the world were sunk to-night our naval superiority would be greater than it is at the present time. We cannot imagine the course of a naval war which would not tend steadily to increase the relative fighting value of the large resources we possess in pre-Dreadnoughts, until, as time went on, quite old vessels would come out and play an important part. We therefore keep such vessels carefully in a material reserve, and arrangements are being perfected by the War Staff to bring them into commission at the sixth, ninth, or twelfth month of any war. All this must be considered in judging the standards of new construction which are appropriate to our needs.

Construction and Maintenance Charges.

The second observation which I would wish to make is this—it is very easy to make rapid increases in new construction so long as you are not burdened with the expense of maintaining a great establishment. Our German neighbours have not yet begun to feel the weight of maintaining year by year a gigantic naval service. These charges mature slowly but remorselessly. The expenses of maintenance apart from new construction must grow irresistibly with every year, and therefore it may be found that as time passes the very rapid rate of new construction which we have seen elsewhere may to some extent be abated by the deadweight drag of increasing maintenance charges. We have a very wide and long experience in the Admiralty. We know the forces which are operative upon the finance of a great navy, and we are not yet convinced that they will not be found, sooner or later, to operate elsewhere. My third observation is this—it is wrong and wasteful to build a single ship for the Navy before it is wanted. Up to the moment when the contract for a battleship has been definitely signed, the vessel is the heir to all the expanding naval science of the world; but from the day when the design has been finally fixed she is obsolescent. She has become a wasting security. Nearly three years of her brief life have been lived before she is born. Before she is even launched the vessels which are capable of destroying her have been projected. It is an ill service to the Navy and to the State to build a single ship before its time. We have to sow each year for the

harvest we require two years later as much as we require and no more. What I might venture to call "the more the merrier" argument is as detrimental to efficiency as to economy. The only safe rule which the British Admiralty can follow is to maintain the *minimum* consistent with full security.

Guarantee by the Admiralty.

Having reviewed our existing naval resources in the light of the foregoing observations, we are not prepared to recommend at the present time the two keels to one standard in new construction against Germany. The time may come when that will be necessary, but it is not necessary now. I will, however, state precisely the standard which we regard as appropriate to the present situation. Before doing so, I should like to make it clear that, as a result of the measures taken by my right hon. friend the Home Secretary, there is no cause whatever for alarm or despondency. The Admiralty are prepared to guarantee absolutely the main security of the country and of the Empire day by day for the next few years, and if the House will grant us what we ask for the future, that prospect may be indefinitely extended. I propose, first of all, to deal with new construction and leave the establishment of the Navy to the last. Standards of naval strength must vary with circumstances and situation. Adequate naval superiority is the object, and the standards which we adopt are necessary though arbitrary guides for securing it. When the next two strongest naval Powers were France and Russia, and when those two Powers were also what one might call the most probably adverse diplomatic combination, the two-Power standard was a convenient rule, based upon reality, for us to follow as a guide. The passage of time and the rise of the Navy of a single Power to the first place upon the Continent have changed this. We have no longer to contemplate as our greatest potential danger the alliance, junction, and co-operation of two naval Powers of approximately equal strength, with all the weakness and uncertainty inherent in such combinations; but we have had for some time to consider the growth and development of a very powerful homogeneous navy, manned and trained by the greatest organising people of the world, obeying the authority of a single Government, and concentrated within easy distance of our shores. In consequence, the two-Power standard, if applied to Europe alone, would be quite inapplicable, because it would be wholly inadequate. On the facts of to-day the Navy we should require to secure us against the most probable adverse combination would not be very much greater than the Navy we should require

to secure us against the next strongest naval Power. In order, therefore, to provide a reason for the necessary measures which have been taken during the last few years it has become necessary to extend the two-Power standard so as to include the United States of America, and thereby the two-Power standard has lost much of its good sense as well as its reality.

Sixty per Cent. Superiority.

The time has come for us to readjust our standard in closer accord with actual facts and probable contingencies. The actual standard of new construction which the Admiralty has in fact followed during recent years has been to develop a 60 per cent. superiority in vessels of the Dreadnought type over the German Navy on the basis of the existing fleet law. There are other and higher standards for the smaller vessels with which I will not complicate the argument, because they do not greatly affect the finance. If Germany were to adhere to her existing law we believe that that standard would, in the absence of any unexpected developments in other countries, continue to be a convenient guide for the next four or five years, so far as this capital class of vessel is concerned. Further than that it is idle to speculate. I must not, however, be taken as agreeing that the ratio of 16 to 10 could be regarded as a sufficient preponderance for British naval strength as a whole above that of the next strongest naval Power. Even if we possessed an Army two-thirds as strong as that of the strongest military Power we could not agree to that. The statement I make is much more limited.

Superiority in Pre-Dreadnoughts.

We are able for the present to adhere to so moderate a standard because of our great superiority in vessels of the pre-Dreadnought era, among which the eight King Edwards and at least eight of the armoured cruisers are quite unmatched among contemporary ships. As these vessels gradually decline in relative fighting value our ratio of new construction would have to rise above the 60 per cent. standard. Every addition which Germany makes or may make to the new ships she lays down each year must accelerate the decline in the relative fighting value of our pre-Dreadnoughts, and therefore requires special measures on our part.

Meeting German Construction.

Applying the standard I have outlined to the House—that is to say, two ships a year for the next six years, because that is what

the law prescribes—applying this standard of 60 per cent. to the existing German Navy Law, and guarding ourselves very carefully against developments in other countries which cannot now be foreseen, it would appear to be necessary to construct for the next six years four ships and three ships in alternate years, beginning this year with four. That is a little above the 60 per cent. standard—it is really over 17 ships to 10—but that is the least that will maintain the 60 per cent. standard. That is what we had in our minds when we framed the Estimates now presented to the House of Commons. If we are now, as it would seem, and I fear is certain, to be confronted with an addition of two ships to the German construction in the next six years—two Dreadnoughts—two ships spread over the six years, we should propose to meet that addition on a higher ratio of superiority by laying down four ships in the same period, spreading them, however, conveniently over the six years so as to secure the greatest evenness in our finances. If we are confronted with three ships additional, we should lay down six over those years, and the forecast of new construction which I now make under all reserve would become four, beginning with this year, five; four, four; four, four; as against the German construction of—two, three; two, two; and three, two. Alternatively, if three were laid down by Germany in the six years our construction would become five, four; five, four; and five, four, an alternation of fives and fours, as against the German alternation of threes and twos.

A Varying Principle.

It is clear that this principle could be varied to suit the circumstances. Let me make it clear, however, that any retardation or reduction in German construction within certain limits will be promptly followed here, as soon as it is apparent, by large and fully proportionate reduction. For instance, if Germany likes to drop out any one, or even any two, of these annual quotas, and keep the money in her own pocket for the enjoyment of her own people and for the development of her own prosperity, we will at once, in the absence of any dangerous development elsewhere and not now foreseen, drop out our corresponding quota. All slowing down by Germany will be accompanied naturally on our larger scale by us. I have to say "within certain limits," because, of course, both Great Britain and Germany have to consider, among other things, the building of other Powers, though the lead of both those countries is at present very considerable over any other Power besides each other. Take as an instance of this proposition which I am putting forward for general consideration, the year 1913. In that year, as I apprehend, Germany

will build three capital ships, and it will be necessary for us to build five in consequence.

The Book of Misunderstanding.

Supposing we were both to take a holiday for that year, and supposing we both introduced a blank page into the book of misunderstanding; supposing that Germany were to build no ships that year, she would save herself between six and seven millions sterling. But that is not all. In ordinary circumstances we should not begin our ships until Germany had started hers. The three ships that she did not build would therefore automatically wipe out no fewer than five British potential super-Dreadnoughts. That is more than I expect they could hope to do in a brilliant naval action. As to the indirect results within a single year, they simply cannot be measured, not only between our two great brother nations, but to all the world. They are results immeasurable in their hope and brightness. This, then, is the position which we take up—that the Germans will be no gainers so far as naval power is concerned over us by any increases they may make, and no losers on the basis I have laid down by any diminution.

A Perfectly Simple Plan.

Here, then, is a perfectly plain and simple plan and arrangement whereby, without any diplomatic negotiations, without any bargaining, without the slightest restriction on the sovereign freedom of either Power, this keen and costly naval rivalry can at any time be abated. It is better, I am sure, to put it quite frankly, for the Parliaments and peoples to judge for themselves. As to the minor vessels in the new programme, I must say a few words. The programme of minor vessels is strictly within the limits of the normal expenditure on this class on ships.

New Torpedoes and Submarines.

We ask the House to sanction the building of 20 torpedo-boat destroyers, and to enable us to lose no time in pressing forward their construction. Upon the information before me in December I thought it proper to send out tenders for the whole flotilla of this year, feeling confident that Parliament would approve them when the time came. The tenders have been received, their examination was completed a few days ago, and we shall be able to allocate the vessels for immediate construction as soon as the House gives us the necessary authority. Provision has been made in the Estimate for their immediate and continuous construction. We are asking about £700,000 this year for the construction of submarines. We do not propose to state the number, because that would indicate with

unnecessary precision the type that these vessels would assume. Submarines are in a state of transition. We have in submarines an ample preponderance, and we can afford to lie back till the last moment, so as to secure the very latest developments.

Small Cruisers.

The only novel feature in the minor programme is the small cruisers. If we had repeated the programme of recent years we should have built four Chathams, about 5400 tons, and one Blonde. We have been considering, however, the cruiser problem as a whole. We observed that the Chathams grew larger each year, and that they did not end the rivalry of type, but approached ever more closely to the armoured class of 10 or 15 years ago. This would be a very expensive development if it were to continue, and we are by no means satisfied that it is a development based on a sound appreciation of naval tactics. Numbers, also, are very important in this sphere, and we propose, therefore, to hark back to smaller vessels and to build eight of these new light-armoured cruisers instead of the four Chathams and Blonde type which have hitherto figured in our programmes. I do not think the House will wish me to go too much into detail about the dimensions and qualities of these vessels. They are described as light-armoured cruisers, and they will in fact be the smallest, cheapest, and fastest vessels, protected by vertical armour, ever projected for the British Navy. They are designed for attendance on the Battle Fleet. They are designed to be its eyes and ears by night and day; to watch over it in movement and at rest. They will be strong enough and fast enough to overhaul and cut down any torpedo-boat destroyer afloat, and generally they will be available for the purposes of observation and reconnaissance.

Docks, Oil, and Aviation.

I have dealt with the programme for the year, and before I come to the important questions connected with the establishment, which we should maintain, there are four topics connected with shipbuilding to which I must refer—docks, oil, aviation, and shipbuilding capacity. The docking accommodation available for the Fleet, actual and prospective, is not unsatisfactory. Indeed, I may say I was very agreeably surprised by an inquiry I undertook into it. We possess at the present time nine docks which can take Invincibles, Lord Nelsons, and all earlier ships; and five of these are suitable for our latest battleships. In a few months there will be two floating docks capable of taking the largest size of ships which exist at present, and these two floating docks will be put, one in the Medway and the

other possibly at Portsmouth. Early next year there will be a new lock ready at Portsmouth, another also of the largest size will be ready in January, 1914. In 1916 the three docks and the lock at Rosyth—four in all—will be available. Meanwhile, there are five private docks wide enough to contain the largest vessel, and two others now in course of construction. In addition to the above there are four others which will take in vessels of the Invincible class. That is, in the opinion of the Admiralty, sufficient provision for our needs at the present time. The question is being considered carefully whether, pending the completion of the docks at Rosyth, one of our floating docks when ready should not be towed to Cromarty and used there as a subsidiary base with floating workshops, pending the creation of the large base which is being developed on the North-East Coast. Further provision for docks will be necessary in 1916 or before 1920, for we have to look four years ahead in regard to docks. But there is no cause for anxiety or complaint in the immediate future.

The Advantages of Oil.

The adoption and supply of oil as a motive power raises anxious and perplexing problems. In fact, I think they are among the most difficult with which the Admiralty have ever been confronted. Oil as a fuel offers enormous advantages to ships of all kinds, and particularly to the smallest kind. In speed, in convenience, in cleanliness, in economy, and in the reduction of *personnel*, oil is incontestably superior to coal. If internal combustion engines of sufficient power to drive warships can be perfected, as may, I think, be hoped for within a very reasonable time, all the advantages of oil will be multiplied, and some of them will be multiplied three or four times over. On the other hand, can we make sure of obtaining full supplies of oil at reasonable prices in time of peace, and without restriction or interference in time of war? Can we accumulate and store a sufficient reserve of oil to meet our ever-growing requirements? Can we make that reserve properly protected against attack, either by aeroplanes or sabotage? All these matters are receiving our continuous attention.

Aviation.

So much has been said in the Army debates during the last few days upon the subject of aviation that only a passing reference to the naval aspect is now required. Early in November my right hon. friend the Secretary for War and I agreed that the War Office and the Admiralty should work together as far as possible in the development

of this vital and important new service. A sub-committee of the Committee of Imperial Defence was set up, which, under the guidance of the Under-Secretary for War, has produced a bold, far-reaching, and carefully-considered scheme. The Admiralty is very much indebted to my right hon. friend for the service he has rendered in this connexion. We have now acquired some land at Eastchurch, adjoining that of the Royal Aero Club, who courteously gave us the use of their aerodrome for flying purposes. The buildings and sheds for a Naval Aviation School are in course of erection. A considerable number of aeroplanes both for training and experimental purposes have been purchased, principally in England, and some of them are being adapted for the special needs of the Navy. We do not require in the Navy to develop aviation on the same great scale as in the Army. We have already a certain number of good naval aviators, and we are going to increase them as rapidly as possible. I hope it will not be many months before regular flights of naval aeroplanes can be attached for ordinary service to the various squadrons and commands of the fleets. I can assure the House that the greatest importance is attached by us to a thoroughly good and effective development of this service, and money shall not stand in the way of any necessary steps.

Mr. LEE (Hants, Fareham, Opp.)—How much?

Mr. CHURCHILL.—We have taken in the Estimates of this year as much as we think we can spend. Although there is no money taken in the Estimates for the purchase of dirigible balloons or dirigible airships, it ought not to be supposed that that subject is not also engaging unremitting attention, especially the latest developments.

Our Shipbuilding Resources.

Lastly, the House is entitled to be relieved of any anxieties which members may feel in regard to the expansive power of the shipbuilding resources of the country. It is not possible to say whether our most prominent competitors can build as fast as we do. What is certain is that they do not in practice do so, and it is also true, I am pleased to say, that we can build, arm, and equip great ships each year, and we can continue that process year after year upon a scale largely in advance of any other single Power, according to its present resources. The House may take it for certain that there is absolutely no danger of our being overtaken unless we decide as a matter of policy to be so. Now I leave new construction and turn to establishment.

Margins of Safety.

Upon the establishment of ships maintained in full commission and upon the number of active service ratings actually permanently available depends our immediate readiness for war. The growing strength of foreign navies, and the increases, actual and prospective, upon which we must reckon in their *personnel*, make it now necessary somewhat to strengthen the force which we keep constantly ready for immediate service in Home waters. I do not think it would be particularly useful at this juncture for me to enter into detailed comparisons between the force which we keep immediately available and the forces which are at the disposal of various foreign Powers, and I hope I shall not be pressed to do so. I would prefer to pursue the general argument. We asked Parliament to assent to large margins of safety. That is not because we do not believe our Fleet, man for man, and ship for ship, would not acquit itself with credit and to the satisfaction of King and country. There is, however, a very practical reason which any layman can understand. We stand as a nation upon the defensive. It is inconceivable that we should make a surprise attack upon Germany or any other European Power. Apart altogether from the moral aspect, which I am not now discussing, what would be the use of it? We have no means of following up such an attack, even if it were successful, and no means of bringing the war to a speedy conclusion. Therefore, I say, we are relegated to the defensive. This entails certain obvious consequences. There is a considerable difference between the number of ships which are available any day taken at random throughout the year and by chance, and the number which could be got ready for a particular date or period marked out in advance. For instance, if the House of Commons sent a Committee down to Portsmouth to-night, and orders were given to mobilise all the ships in the harbour, we could produce a certain number. If, however, we were told privately beforehand that the Committee were going down to see how many ships we could turn out at short notice, say, on April 1 or May 1, we could produce from 25 to 30 per cent. more. That is a very important fact which any one can appreciate. It is a fact which makes it necessary for us to have a sufficient margin to be able to meet at any moment the naval force of an attacking Power at their selected moment.

Our Peculiar Position.

The second reason why we must have an ample margin is that the consequences of defeat at sea are very much greater to us than they would be to Germany or to France. There is no similarity

between our naval needs and those of the two countries I have mentioned. There is no parity of risks. Our position is highly artificial. We are fed from the sea; we are an unarmed people; we possess a very small Army, and we are the only Power in Europe which does not possess a large army. We cannot menace the independence or the vital interests of any great Continental State. We cannot invade any Continental State. We do not wish to do so, but even if we had the wish, we have not got the power. These are facts which justify British naval supremacy in the face of the world. If ever any single nation were able to back the strongest fleet with an overwhelming army, the whole world would be in jeopardy, and a catastrophe would swiftly occur.

People talk of the proportion which the navies of different countries should bear to the commercial interests of the different nations, and the proportion of France, the proportion of Italy, the proportion of Germany to their respective mercantile marines. But when we consider our naval strength we are not thinking of our commerce, but of our freedom. We are not thinking of our trade, but of our lives. Nothing, of course, can make us absolutely safe against combinations which the imagination can summon up. We have faced combinations over and over again in the past, and sometimes heavy odds, but we must never conduct our affairs so that the navy of any single Power would be able to engage us at any single moment—even our least favourable moment—with any reasonable prospect of success. If this is "insular arrogance," it is also the first condition of our existence! I am glad to be able to assure the House that no difficulty will be experienced in making arrangements to maintain our relative position in the near future, and to secure as quickly as we need them adequate margins of safety. I am glad also that these measures will not involve any excessive or disproportionate expense. We should not, of course, require to build any more ships other than those I have referred to under the head of New Construction. All we should need to do is to bring up, as we require it, and no sooner, a larger portion of our existing Fleet into a higher status of commission, and consequently of greater readiness.

Reorganisation of the Fleet.

We propose at the present time, in view of the increases which are in progress, to recast completely the organisation of the Fleet. Under the new organisation the ships available for Home defence will be divided into the First, Second, and Third Fleets. The whole three Fleets will comprise eight battle squadrons of eight battleships each, together with their attendant cruiser squadrons, flotillas, and

all auxiliaries. Each of these three Fleets will represent a distinct administrative status and standard of commission. The First Fleet will comprise four battle squadrons of fully commissioned ships, with a Fleet flagship. The battleships of the First and Second Divisions of the Home Fleet will become the First and Second Battle Squadrons. The Atlantic Fleet will be based on Home ports instead of Gibraltar, and will become the Third Battle Squadron. During the course of the present year, as new vessels join the Fleet at the top of the list, this squadron, which now consists of six battleships, will be increased to eight; so that the Fourth Battle Squadron formed of battleships now in the Mediterranean will step into the place of the Atlantic Fleet and be based on Gibraltar, raised ultimately and if necessary to a strength of eight ships. The Fourth Battle Squadron will from its strategic position at Gibraltar be able to give immediate assistance in Home waters or in the Mediterranean should naval combinations in that area render its presence necessary or useful. Its movements will be regulated by the main situation. These four squadrons will constitute the First Fleet. The Second Fleet will be composed of two battle squadrons, with their attendant cruiser squadrons on what is called the existing Third Division scale. The ships maintained on this scale cost practically as much to man each year as ships in full commission. They have a full complement of active service ratings always provided. They do not require any mobilisation reserve which is in civil life. Half their crews, including a large proportion of special ratings, are always on board; the other half, roughly speaking, are in the schools and barracks on shore, going through the courses of instruction, and the regular circulation of which is essential to the good organisation and training of the Navy. I hope the scale will not be underrated because they are called vessels maintained with nucleus crews. They are vessels with full crews constantly provided. The system has been adopted in order that the courses of instruction may be performed, and that the active service ratings may have in rotation a fair share of time on shore instead of always being engaged on service afloat. There is one serious defect which appears to attach to the Third Division compared with full-commissioned vessels. It is possible that they might be cruising away from their Home ports with half nucleus crews on board, and when the emergency came, they would have to go back to the Home ports to take on the rest of the crew in the schools and barracks; and consequently some delay might at certain times in the year be caused in their readiness for active service. It may be two or three days. We propose to reduce the defect by the following arrangement. At present the Third Division consists of eleven battleships. We propose

to raise the number to sixteen, and to divide them into the Fifth and Sixth Battle Squadrons forming the Second Fleet. The movements of the Fleet will be arranged so that one of these two battle squadrons will be always present in Home ports, and ready to move as soon as steam can be raised. The other will usually be in that condition. The division of the Second Fleet into two battle squadrons will take place at once, but the full strength of these squadrons will not be realised for several years unless circumstances render the acceleration of the process necessary. When the process is complete, the First and Second Fleets will comprise forty-nine battleships available at the shortest notice, completely manned with the regular active service ratings of the Navy. By the time this work is completed, we may expect that the next strongest naval Power, *i.e.*, Germany, will possess twenty-nine battleships ready immediately without mobilisation for war, of which twenty-five will be in full permanent commission. At present we have only twenty-two battleships in full commission in Home waters, even including the Atlantic Fleet. It is clear in view of these developments that a large expansion on our part is necessary; and I hope that the House will realise the full scope and the simplicity of the measures we propose to take to give us the power we shall need. The Third Fleet will also consist of two battle squadrons together with the remaining four cruiser squadrons. It will be manned on the present Fourth Division scale by reduced nucleus crews; and on mobilisation there will be added an additional proportion of active service ratings, and the rest of the ships' complement will be made up from the mobilisation reserves now in civil life. A proclamation is required in due form before the Third Fleet can proceed to sea in its entirety, and although every effort will be made to accelerate the process of mobilisation, a few days' delay will be inevitable before the Third Fleet can be ready for sea.

New Class of Fleet Reserve.

With the view of securing, at any rate, a portion of this Fleet on an emergency and at very short notice, we propose to institute and develop a new class of Royal Fleet Reserve to be called "the Immediate Reserve." This force, which will be limited at present, will consist of about 5000 men. It will be composed of men who volunteer for this special service, receiving a shilling a day instead of sixpence, and liable to be called out to serve in an emergency without the need of general mobilisation. From the inquiries we have been making we have reason to believe that a very considerable

proportion of the men of the Royal Fleet Reserve will be willing to give us their services. They have all served in the Navy from five to ten years; they are men of the highest character and of substantial position. A large proportion of these men will be drawn from those who are already in Government employment in the dockyards, post office, fire brigades, and elsewhere. It will be necessary, in order that real efficiency may be secured to the ships manned by this proportion of the Reserve, that the Immediate Reserve should pass through twenty-eight days' training each year on the actual ships on board of which they will serve on mobilisation. They will not be a large pool of Reserve men who are sent anyhow through the Fleet according to the needs of any particular mobilisation. They will know exactly what ship they will be allocated to in war, and on that ship they will serve their twenty-eight days' training. They will know what gun or torpedo tube they will serve at, and with whom they will serve. In future the Coast-guard, one of the prizes which is offered by the British Government to sailors, will be confined to men who have given this special service in the Immediate Reserve. We shall have to rely on the patriotism of the employers. Not a very large number is involved, but very satisfactory replies have been received, showing a desire to facilitate the development of a Reserve so necessary to the Service. Arrangements will be made, if necessary and if it is desired, through the labour exchanges to provide suitable and competent substitutes during the time that the Reserve men are doing their annual training. The Immediate Reserve men will enable us to mobilise and man the Seventh Battle Squadron and another cruiser squadron at short notice; and we expect the standard of efficiency of the two squadrons will be far above the ships of the present Fourth Division scale. The present Fourth Division scale will only apply to the Eighth Battle Squadron, which will consist of the oldest ships we have. We do not propose to provide crews for the Eighth Battle Squadron unless it becomes necessary, and until a better class of ships filter down through new ships joining at the top of the list. The vessels for which no crews are provided will be passed into the material Reserve, care being taken to keep them in readiness so as to replace ships lost in action but whose crews are saved when the vessel is destroyed. Thus we estimate for the purpose of comparison a total mobilised fleet of fifty-seven, or if necessary sixty-five, battleships, compared with thirty-eight of the next naval Power. This proportion of fifty-seven to thirty-eight would not be sufficient if numbers were the only test or measure of naval superiority; but it must be remembered that our superiority ship for ship can be traced all down the line, and it is very important

when the older classes of vessels are concerned. As what I may call the "Dreadnoughtisation" of other navies progresses, it will be necessary to raise not merely the quality but the scale of our fleets, and the new organisation I have unfolded would lend itself rapidly to further requirements. It would be easy simply to increase the squadrons from eight to nine or ten ships. Let me repeat, however, that, just as in the case of new building, we shall proceed in the development and perfection of this new organization step by step as may be necessary, and the rate of our development will be slowed down if we are convinced that a corresponding retardation has begun elsewhere.

Destroyer Flotillas.

With regard to the flotillas of torpedo-boat destroyers, it will also be necessary to make some expansion. We are forming a Seventh Flotilla of twenty destroyers this year. We should propose to form an Eighth Flotilla next year, and it may be that we shall have to form a Ninth Flotilla in 1915. These flotillas will be formed simply by maintaining the older vessels in commission with nucleus crews instead of striking them off as new destroyers of each year are commissioned. In connexion with the flotillas, we propose to institute a new command. At present three flotillas manned by nucleus crews, and certain submarines are provisionally assigned to the duties of coast defence. They are now under the control of the Vice-admiral commanding the Third Division. With a view to their better training in peace, it is now thought necessary they should be placed under a special admiral. In war they will be controlled through this officer directly from the Admiralty, so as to enable the Battle Fleet or fleets to operate with the utmost freedom and confine themselves to the prime business of defeating the enemy's Battle Fleet, without being diverted from that task by the necessity of protecting the British coasts from any minor raid or descent, whether naval or military. The officer in charge of this new command will be called the "Admiral of Patrols," and, of course, the vessels at his disposal will be available for all purposes besides those which I have indicated as being in the forefront of their most obvious duties. As I have already told the House, the immediate cost of these measures will not be great, though the charges will gradually augment and will be recurring. The principal item of increase is the *personnel*. The rate of increase in Germany under the existing Navy Law is 3500 men a year. This year they have added 3712 men. Against that we are asking now—I think the House will believe with great moderation—for no more than 2000 men increase on the average,

which means that we can recruit up to 3000 more by the end of the year. If there are any additional increases elsewhere we shall find it necessary, in order to man the war Fleets at the various dates in the future and to develop the Fleet organisation, to ask a substantial addition immediately.

More Commissioned Officers.

After the House has listened to these important proposals, a very few sentences will suffice to explain certain subsidiary points which will be entailed by them. It takes a long time to train men for the Navy, but it takes still longer to train officers. On the other hand, we require at once to have a substantial increase to the lieutenants' list. The pressure at the present time upon the officers of the Navy is very severe, and it is not always possible to allow them the full amount of leave to which they are entitled in the course of every year, small as it is; and with the development of the new Fleet organisation this strain will, in ordinary circumstances, be greatly increased. It is therefore necessary for us to have more commissioned officers, and to have them as soon as possible. We propose, therefore, to take two steps which, I hope, will commend themselves to the House and to the Service. Everyone acquainted with the Navy must have been struck by the extraordinary high qualities of discipline and intelligence which are displayed by the best class of warrant officer. These are the days when the Navy, which is the great national Service, should be opened more broadly to the nation as a whole. The question, as the House knows, is fraught with difficulties. We have thought them well over, and we are agreed in believing that there are no difficulties which cannot be, and ought not in the public interest to be, overcome. We propose, therefore, to select a considerable number of the younger warrant officers, by yearly instalments of twenty-five to thirty, up to a total of 100, possibly more, for promotion to the rank of commissioned warrant officer, a rank which already exists and which is equivalent to that of sub-lieutenant. After duly qualifying for their new duties, these officers will be appointed to ships and be available for all executive duties of sub-lieutenants. They will, of course, be eligible for promotion, strictly according to their merits, to the higher ranks. As, however, they will start as commissioned officers some years later than those who enter the Navy through the naval colleges, it is probable that the great bulk of them will retire content with a career which will have carried them from bluejacket to commander. If this should, in practice, be the result of our

departure we shall have made the necessary addition to the lieutenants' list without producing that block in promotion to the higher ranks which would otherwise be inevitable, and which would be deeply injurious to the Service as well as unjust to the individuals. Such a block would produce aged captains and venerable admirals.

LORD C. BERESFORD: Hear, hear. (Laughter.)

MR. CHURCHILL: It would also prevent men reaching what are, perhaps, commands of the most direct responsibility in the world while they are still in the prime of their manhood, and, otherwise, it would injuriously affect the efficiency of a fighting service. As the promotion of a number of the younger warrant officers may be thought to affect somewhat hardly the warrant officer of many years' service, it is proposed to concede to them what they have so long desired, namely, promotion to the rank of commissioned warrant officer after fifteen years' service as warrant officer, instead of after some twenty years, as now, provided they are found fit; so that there are really two careers which the warrant officer can embark on, one of which will lead to promotion after fifteen years' service to a commission and probably employment on shore, and the other of which will carry with it much speedier promotion as warrant officers and continuous employment on fully-commissioned ships. The details of this scheme are now being worked out. We have also been struck with the age and size of the senior midshipmen. I am strongly of opinion that a young gentleman of nineteen or twenty who has been trained for six years or more exclusively for the profession of arms, and who has qualified in every way required of him, deserves advancement to the rank of commissioned officer. We therefore propose to allow midshipmen to qualify in navigation and seamanship at the end of two years and four months' service as midshipmen. It is better to split up the examination into two parts instead of giving them the long and exhausting three weeks' trial they are put to at the present time. If they are successful in qualifying in navigation and seamanship, they will at once be promoted to the rank of acting sub-lieutenant and be available for all the duties of that rank. Eight months later they will have to pass in the remaining subjects of their course, and then receive their regular commission as sub-lieutenants.

CONTINUOUS COMMISSIONS.

We propose to make a change forthwith in the system which now regulates the commissioning of ships. Under the present system of two years' commissions the Admiralty has sought to keep the captain,

officers, and men of a ship's company together if possible without any changes for the whole period of the two years. This is not, however, possible in practice. Death, illness, retirement, promotion, the necessity for qualifying or requalifying in the evermore numerous courses of instruction, are always producing large and inevitable changes even during the short period of a two years' commission. On the other hand, there is a grave loss in efficiency and war power and a serious waste of human effort involved in the process of killing the live ship every two years, by dispersing officers and crews far and wide and deliberately destroying the efficiency as a fighting ship, which has been gained with so much trouble and has now to be started afresh next morning under a completely new *régime*. We have come to the conclusion that it is far better to keep the ship continuously in commission at the same high level of efficiency; and we therefore propose to revert to the system of continuous commissions which was in force before the two years' commissions were introduced, but to effect the changes in *personnel* more systematically and at regular intervals. The system of continuous commission will be extended to all ships manned with nucleus crews. Up to now these ships have not only had to make themselves efficient with half a crew instead of a whole one, but they have had to hand over these nucleus crews on an average every eight months to a fully manned ship about to recommission and to start afresh themselves with a new half crew selected from the barracks and schools. The system cannot of course be applied to ships on foreign stations, nor to torpedo craft in Home waters. Three-year commissions will therefore be adopted on foreign stations and two-year commissions will remain in force for torpedo craft.

Subjects of Inquiry.

Three inquiries into very important subjects of naval administration have been, or are being, held at the present time. The first has been into the gunnery of the Fleet and into the methods of training and testing the officers and men in this supreme and paramount service. That inquiry is now completed, and the results are being carefully weighed. It has been a conference as well as an inquiry at which a large number of the best sea-going officers have been present. It is possible I may have to make a slightly larger request to the House for practice ammunition, and I shall not hesitate to do so if that is necessary. A second inquiry which is to be instituted will deal with the whole system of the entry and education of cadets and midshipmen. I must make it clear, however, that this inquiry implies no departure

from or reversal of the policy of naval training instituted in 1902, but rather is calculated to give full effect to it. The House will be glad to learn that Sir Reginald Custance has accepted my invitation to preside over this committee, which will commence its labours at once. Thirdly, the time has come when there must be a full inquiry into the system of summary punishments which are now in force, including their consequential effects as regards pay, position, badges, and pension. It is of high importance to the interests of the Navy that the system of punishment should be physically and morally beneficial as well as corrective, and that it should be so devised in regard to offences where no dishonour is involved as not to wound the self-respect of fighting men.

The General Principle of Administration.

I hope the House will discern from the account I have given the general principle of naval administration to which we adhere—homogeneity of squadrons, simplicity of types and classes, modernity of material, concentration in the decisive theatres, constant and instant readiness for war, reliance upon gun-power, reliance upon speed, and, above all, reliance upon 136,000 officers and seamen, the pride of our race, bred from their boyhood up to the permanent service of the sea. These are the principles which we ask the House of Commons to approve. For the rest I have only a word to say. The spectacle which the naval armaments of the nations of Christendom afford at the present time will no doubt excite the curiosity and the wonder of future generations. Here are seen all the polite peoples of the world, as if moved by spontaneous impulse, devoting every year an immense and ever-growing proportion of their wealth, their manhood, and their scientific knowledge to the construction of gigantic military machinery which is obsolescent as soon as it is created, which falls to pieces almost as soon as it is put together, which has to be continually renewed and replenished on an ever larger scale, which drains the coffers of every Government, which denies and stints the needs of every people, and which is intended to be a means of protection against dangers which perhaps have no other origin than in the mutual fears and suspicions of men. The most hopeful interpretation which can be placed upon this strange phenomenon is that naval and military rivalries are the modern substitute for what in earlier ages would have been actual wars, and just as credit transactions have in the present day so largely superseded cash payments, so the jealousies and disputes of nations are more and more decided by the mere possession of war

power without the necessity for its actual employment. If that were true, the grand folly of the twentieth century might be found to wear a less unamiable aspect. Still, we cannot conceal from ourselves the fact that we live in an age of incipient violence and strong and deep-seated unrest. The utility of war even to the victor may in most cases be an illusion. Certainly all wars of every kind will be destitute of any positive advantage to the British Empire, but war itself, if ever it comes, will not be an illusion; even a single bullet will be found real enough. The Admiralty must leave to others the task of mending the times in which we live, and confine themselves to the more limited and more simple duty of making quite sure that, whatever the times may be, our island and its people will come safely through them.

Result of Test of Gunlayers with Heavy Guns in His Majesty's Fleet, 1902–1911.

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
Number of ships that fired .	139	134	108	100	89	121	117	116	117	127
Number of guns or turrets .	1,241	1,296	1,171	1,096	1,073	1,365	1,277	1,312	1,318	1,496
Number of hits 1906 target	4,789	5,996	5,748	4,374	5,733	7,547	..	..	..	..
Number of hits 1907 ,,	..	..	..	..	..	4,073	4,826	5,108	3,520	3,944
Number of hits Ricochet .	..	..	..	..	..	..	..	..	436	570
Number of misses 1906 target	6,863	7,028	7,664	3,357	2,328	1,991	..	..	..	..
Number of misses 1907 ,,	..	..	..	..	..	5,465	4,183	4,330	3,253	3,714
Excess of hits over misses . 1906 ,,	Nil	Nil	Nil	1,017	3,405	5,556	..	..	..	..
Excess of hits over misses . 1907 ,,	..	..	..	..	..	Nil	643	778	703	800*
Excess of misses over hits . 1906 ,,	2,074	1,032	1,916	Nil	Nil	Nil	..	..	..	..
Excess of misses over hits . 1907 ,,	..	..	..	..	..	1,392	Nil	Nil	Nil	Nil
Percentage of hits to rounds fired 1906 ,,	41·1	46·04	42·86	56·58	71·12	79·13	..	..	..	..
Percentage of hits to rounds fired 1907 ,,	..	..	..	..	..	42·70	53·57	54·12	51·85	50·01
Hits per gun per minute—										†
12" and 10" . 1906 target	·38	·53	·47	·58	·81	·61	..	..	..	..
12" and 10" . 1907 ,,	..	..	..	..	..	·40	·56	·63	·70	·58‡
9·2" . . . . 1906 ,,	·35	·70	·73	1·40	2·84	3·25	..	..	..	..
9·2" . . . . 1907 ,,	..	..	..	..	..	2·01	2·20	1·94	2·01	1·90‡
7·5" . . . . 1906 ,,	..	..	..	..	..	3·48	..	..	..	..
7·5" . . . . 1907 ,,	..	..	..	..	..	1·58	2·51	2·47	2·61	2·78‡
6" B.L. and Q.F. . . . 1906 ,,	2·41	2·63	2·63	4·14	5·68	5·93	..	..	..	..
6" B.L. and Q.F. . . . 1907 ,,	..	..	..	..	..	3·32	3·98	4·03	3·69	3·89‡
4·7" Q.F. and 4" B.L. and Q.F. 1906 ,,	2·02	2·47	2·28	3·73	4·96	5·73	..	..	..	..
4·7" Q.F. and 4" B.L. and Q.F. 1907 ,,	..	..	..	..	..	2·38	3·32	4·06	3·84	3·91‡
Number of ships from whom no returns were received.	19	30	43	Nil	Nil	3	8	10	12	19

* Counting ricochet as whole hits.

† The figures for 1911, counting ricochets as whole hits, would be 54·86.

‡ Ricochet hits counting $\frac{3}{10}$th hit. Results not directly comparable with those obtained in 1910.

Abstract, 1911.

Order of Merit.	Fleet or Squadron.	No. of Ships.	No. of Men Firing.	Points per Gun or Turret.	First Ship in Fleet.	Score.
1	East Indies	1	11	78·43	Highflyer . .	78·43
2	China	6	70	69·715	MINOTAUR . .	86·02
3	Atlantic Fleet and Fifth Cruiser Squadron. .	13	190	48·339	Duke of Edinburgh . .	57·85
4	Mediterranean Fleet and Sixth Cruiser Squadron	14	186	47·639	Russell . . .	70·36
5	Home Fleet, Second Division, and Second Cruiser Squadron .	11	176	44·479	Natal . . .	66·27
6	Home Fleet, Third Division, and Cruisers	34	411	43·852	Sapphire . .	64·79
7	Australia	8	79	41·328	Powerful . .	66·82
8	Fourth Cruiser Squadron	7	82	37·960	Brilliant . .	64·61
9	Home Fleet, First Division, and First Cruiser Squadron .	13	126	35·383	Blanche . .	46·85
10	Special Service Tenders	14	69	32·140	Cadmus . .	56·85
11	Cape of Good Hope . .	3	29	28·390	Hermes . .	45·69
	Total, 1911 Test .	127	1,429	43·297		
	Total, 1910 Test .	117	1,318	42·649		
	Difference . . .	+10	+111	+·648		

NOTE.—The 4-in. guns of Bellerophon and Invincible classes are not included in this Abstract.

Results of Test of Gunlayers with Heavy Guns.

Order of Merit.	Ship.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Rounds.	Total Number of Hits. Direct.	Total Number of Hits. Ricochet.	Total Number of Rounds per minute.	Total Number of Hits per minute.	Points per Gun or Turret.	Best Shot in Ship.	Hits per minute by Best Shot.	Comparison with previous year. Hits per minute 1910.	Comparison with previous year. Hits per minute 1911.
*1	Challenger	..	90·76	11	6″ B.L. VII.(*b*)	66	43	5	11·09	7·64	90·76	J. E. Bennett, L.S.	14·40	3·73	† 7·64
1a	Minotaur	2nd	86·02	4	9·2″ B.L. XI.	15	10	1	4·82	3·34	57·68	W. Grover, P.O. (2)	4·21	3·30	3·34
				10	7·5″ B.L.	60	39	4	8·01	5·53	91·69	R. Russell, L.S.	10·00	3·25	5·53
2	Highflyer	1st	78·43	11	6″ Q.F.	66	50	4	7·30	5·75	78·43	E. G. Hewitson, P.O.(1)	9·00	..	5·75
3	Flora	2nd	75·47	2	6″ Q.F.	12	9	1	8·75	6·82	93·02	R. Eggleton, P.O. (1)	7·77	4·08	6·82
				8	4·7″ Q.F.	48	30	1	9·14	5·88	71·09	F. Laughrin, A.B.	10·29	3·62	5·88
4	Monmouth	2nd	75·20	12	6″ B.L. VII. (*b*)	67	45	4	8·95	6·33	75·20	H. Fowler, L.S.	10·29	4·69	6·33
5	Russell	2nd	70·36	4	12″ B.L. IX.	15	9	0	3·93	2·31	66·97	W. H. Martin, P.O. (1)	3·46	1·50	2·31
				12	6″ B.L. VII. (*b*)	69	48	2	8·47	5·97	70·92	H. Durrant, P.O. (1)	8·78	3·95	5·97
6	Powerful	2nd	66·82	2	9·2″ B.L.	8	4	0	2·53	1·26	66·67	J. H. Bylett, P.O. (1)	1·89	0·00	1·26
				16	6″ Q.F.	95	57	2	8·04	4·90	66·84	P. H. Moody, P.O. (1)	10·00	4·70	4·90
7	Natal	2nd	66·27	6	9·2″ B.L. X.	36	20	4	4·40	2·67	55·40	A. Stott, Act. Bom., R.M.A.	4·48	4·47	2·67
				4	7·5″ B.L.	23	20	1	5·59	4·98	82·57	J. Scott, P.O. (1)	7·27	5·32	4·98
8	Kent	2nd	65·58	12	6″ B.L. VII. (*b*)	63	46	6	7·27	5·52	65·58	J. Acton, A.B.	8·57	4·24	5·52
9	Exmouth	1st	64·98	4	12″ B.L. IX.	13	3	3	2·63	0·79	22·90	J. Thundercliffe, P.O.(1)	1·84	0·77	0·79
				12	6″ B.L. VII. (*b*)	72	45	7	9·18	6·06	71·99	B. Clarke, Gnr., R.M.A.	10·91	4·55	6·06
10	Dominion	2nd	64·80	4	12″ B.L. IX.	15	7	3	3·12	1·64	42·16	J. E. Yates, P.O. (1)	1·25	0·72	1·64
				4	9·2″ B.L. X.	24	20	1	4·95	4·19	86·94	J. H. Taylor, P.O. (1)	4·77	1·54	4·19
				10	6″ B.L. VII. (*a*)	50	35	4	6·97	5·09	60·47	J. L. W. Gerrie, P.O. (1)	10·00	1·95	5·09
11	Sapphire	2nd	64·79	12	4″ Q.F.	69	46	0	11·04	7·43	64·79	J. B. A. Cook, Lnc. Corp., R.M.L.I.	13·85	6·47	7·43
12	Brilliant	2nd	64·61	2	6″ Q.F.	12	7	0	6·11	3·55	48·42	J. E. Williams, L.S.	4·00	5·00	3·55
				6	4·7″ Q.F.	36	23	1	9·09	5·79	70·00	A. Richer, Pte., R.M.L.I.	8·11	4·52	5·79

13	Newcastle . . .	1st	61·56	2	6″ B.L. IX. .	10	4	2	6·67	3·07	38·53	C. F. Rix, P.O. (1) .	4·40	..	3·07
				10	4″ B.L. . .	56	37	1	10·20	6·85	66·17	R. W. Watts, Pte., R.M.L.I.	11·39	..	6·85
14	Irresistible. . .	1st	61·01	4	12″ B.L. IX. .	12	2	2	2·40	0·52	15·07	J. Larcombe, C.P.O. .	1·84	..	0·52
				12	6″ B.L. VII. (b)	69	44	8	8·63	5·78	68·67	J. Clarke, P.O. . . .	8·47	..	5·78
15	Commonwealth .	1st	60·96	4	12″ B.L. IX. .	16	6	2	3·81	1·55	39·85	M. Waugh, P.O. (1) .	1·48	1·38	1·55
				4	9·2″ B.L. X. .	23	16	1	4·43	3·29	68·27	J. E. Ward, Act. Bom., R.M.A.	6·10	1·95	3·29
				10	6″ B.L. VII. (a)	55	36	5	7·66	5·24	62·25	S. Hall, Gnr., R.M.A.	7·76	5·39	5·24
16	Antrim . . .	2nd	60·57	4	7·5″ B.L. . .	24	10	3	5·74	2·64	43·77	C. J. Jarvis, P.O. . .	3·66	3·29	2·64
				6	6″ B.L. VII. (a)	34	26	2	7·70	6·04	71·76	J. H. Chitty, Pte., R.M.L.I.	7·76	2·88	6·04
17	St. George . . .	1st	59·20	4	6″ Q.F.	23	13	5	6·90	4·34	59·20	A. H. Culmer, P.O. .	7·83	..	4·34
18	Illustrious (*New Commission*)	1st	58·95	4	12″ B.L.VIII. .	10	1	1	2·00	0·26	7·54	F. Bulley, C.P.O. . .	0·80	0·81	0·26
				12	6″ Q.F. . . .	70	48	1	7·06	4·95	67·52	W. H. Young, L.S. .	7·66	4·19	4·95
19	Encounter . .	2nd	58·57	11	6″ B.L. VII. (b)	61	37	7	7·66	4·93	58·57	C. Denial, Pte., R.M.L.I.	6·98	2·92	4·93
20	Duke of Edinburgh	2nd	57·85	6	9·2″ B.L. X. .	35	18	3	5·56	3·06	63·50	C. Todd, C.P.O. . . .	6·12	2·22	3·06
				10	6″ B.L. XI. .	51	29	3	7·24	4·34	54·47	H. J. Johns, P.O. (1) .	9·18	2·60	4·34
21	Prince of Wales .	1st	57·56	4	12″ B.L. IX. .	15	6	4	3·30	1·58	45·80	F. W. Hinton, P.O. (1)	2·16	1·38	1·58
				12	6″ B.L. VII. (b)	71	38	4	8·78	5·01	59·52	J. Rogers, L.S. . .	11·11	1·82	5·01
22	Cornwallis . . .	1st	57·20	4	12″ B.L. IX. .	14	7	2	2·81	1·52	44·06	J. Harvey, P.O. (2) .	2·40	..	1·52
				12	6″ B.L. VII. (b)	64	42	4	7·41	5·00	59·40	S. Dominey, Corp., R.M.L.I.	7·06	..	5·00
23	Cadmus . . .	1st	56·85	6	4″ Q.F. . . .	32	20	3	9·80	6·52	56·85	E. Greenside, P.O. (1).	12·95	1·90	6·52
24	Victorious . . .	1st	56·69	4	12″ B.L. VIII.	11	6	0	2·28	1·24	31·88	J. Smeaton, L.S. . .	1·24	0·62	1·24
				12	6″ Q.F. . .	68	46	5	6·26	4·46	60·83	J. Clerk, Lce.-Corp., R.M.L.I.	8·18	5·10	4·46
25	Jupiter	1st	56·02	4	12″ B.L. VIII.	15	4	2	3·11	0·96	24·68	W. L. Barlow, P.O. (1)	0·83	0·93	0·96
				12	6″ Q.F. . . .	70	45	4	6·74	4·49	61·24	E. Goodyear, Corp., R.M.A.	8·78	5·10	4·49
26	Antelope . . .	2nd	55·86	2	4·7″ Q.F. . .	12	7	2	7·28	4·62	55·86	A. Hopping, C.P.O. .	5·27	..	4·62
27	Argyll	2nd	55·78	4	7·5″ B.L. . .	24	9	1	5·96	2·35	38·96	W. A. Reed. P.O. (1) .	3·64	3·32	2·35
				6	6″ B.L. VII. (a)	34	21	3	8·60	5·64	67·00	S. W. H. Andrews, L.S.	9·38	2·91	5·64
28	Topaze	2nd	55·28	12	4″ Q.F. . . .	69	40	5	10·77	6·34	55·28	E. Huxford, A.B. . .	9·49	7·57	6·34
29	Bacchante . . .	2nd	54·55	2	9·2″ B.L. X. .	9	3	0	2·85	0·95	19·71	W. Henley, P.O. (1) .	1·89	1·26	0·95
				12	6″ B.L. VII. (b)	64	43	4	7·33	5·08	60·35	C. Looker, Gr., R.M.A.	8·49	2·80	5·08
30	Astræa	1st	54·46	2	6″ Q.F. . .	11	4	1	6·41	2·80	38·19	F. Day, P.O. . . .	5 61	4·51	2·80
				8	4·7″ Q.F. . .	47	22	3	9·72	4·84	58·52	J. Street, L.S. . . .	9·87	6·42	4·84

(a) = ⅔ charge. (b) = ½ charge. * Return received too late for insertion in compiled list by Admiralty.
† Ricochet hits counting $\frac{1}{10}$th hit. Not directly comparable with 1910.

RESULTS OF TEST OF GUNLAYERS WITH HEAVY GUNS—*continued.*

Order of Merit.	Ship.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Rounds.	Total Number of Hits. Di-rect.	Total Number of Hits. Rico-chet.	Total Number of Rounds per minute.	Total Number of Hits per minute.	Points per Gun or Turret.	Best Shot in Ship.	Hits per minute by Best Shot.	Comparison with previous year. Hits per minute, 1910.	Comparison with previous year. Hits per minute, 1911. †
*31	Irresistible (*New Commission*)	..	53·92	4	12″ B.L. IX.	14	4	0	2·86	0·80	23·19	J. W. Lobb, P.O. (1)	1·60	0·52	0·80
				12	6″ B.L. VII. (*b*)	66	40	2	7·97	4·97	59·04	H. Partington, A.B.	10·00	5·78	4·97
31a	Glasgow	1st	52·52	2	6″ B.L. XI.	12	9	0	8·39	6·33	79·44	W. Perks, P.O. (1)	7·32	..	6·33
				10	4″ B.L.	52	28	0	9·15	4·88	47·14	J. Laurence, Pte., R.M.L.I.	8·57	..	4·88
32	Cumberland	2nd	52·51	12	6″ B.L. VII. (*b*)	65	34	11	7·63	4·42	52·51	J. Nolan, L.S.	7·27	1·85	4·42
33	Illustrious	1st	52·34	4	12″ B.L. VIII.	11	4	0	2·22	0·81	23·48	J. W. Lobb, P.O. (1)	1·64	0·50	0·81
				12	6″ Q.F.	71	37	3	7·70	4·19	57·15	A. Frost, A.B.	9·18	4·97	4·19
34	Cæsar	1st	52·28	4	12″ B.L. VIII.	10	2	0	2·00	0·40	11·60	E. Summerhill, C.P.O.	0·80	0·83	0·40
				12	6″ Q.F.	67	47	1	6·15	4·33	59·06	S. Dark, L.S.	6·67	3·90	4·33
35	London	2nd	52·16	4	12″ B.L. IX.	14	3	1	3·65	0·84	24·35	W. C. Hadley, P.O. (1)	1·33	0·53	0·84
				12	6″ B.L. VII. (*b*)	69	37	5	8·57	4·78	56·79	W. H. Cockerill, P.O. (1)	8·11	3·86	4·78
36	Suffolk	2nd	52·15	12	6″ B.L. VII. (*b*)	66	35	8	7·68	4·39	52·15	W. Roose, L.S.	9·23	2·82	4·39
37	Prince George	1st	50·87	4	12″ B.L. VIII.	11	4	0	2·28	0·83	21·34	G. Cheater, P.O. (1)	1·24	0·72	0·83
				12	6″ Q.F.	71	40	6	6·82	4·09	55·79	W. Smith, C.P.O.	7·26	3·96	4·09
*38	Aeolus	...	50·05	2	6″ Q.F.	12	6	0	6·16	3·11	42·42	H. Wild, P.O.	4·21	..	3·11
				6	4·7″ Q.F.	35	19	0	8·02	4·35	52·29	W. J. P. Carr, A.B.	5·39	..	4·35
38a	Implacable	1st	49·77	4	12″ B.L. IX.	15	8	0	3·35	1·79	51·89	S. H. Hammond, A.B.	3·53	1·37	1·79
				12	6″ B.L. VII. (*b*)	64	36	1	7·33	4·16	49·42	W. C. Austen, A.B.	9·33	2·68	4·16
39	Hogue	1st	49·72	2	9·2″ B.L. X.	11	2	1	3·89	0·80	16·60	J. O'Neil, C.P.O.	0·82	1·81	0·80
				12	6″ B.L. VII. (*b*)	70	33	8	9·12	4·65	55·24	T. Vickery, P.O. (1)	7·82	3·58	4·65
40	Black Prince	2nd	49·46	6	9·2″ B.L. X.	34	24	4	4·23	3·18	65·99	W. H. Seal, P.O. (1)	5·17	2·20	3·18
				10	6″ B.L. XI.	51	22	3	6·92	3·15	39·53	E. E. Phillips, C.P.O.	7·83	4·11	3·15
41	Falmouth	1st	49·32	8	6″ B.L. XI.	43	23	2	7·17	3·93	49·32	E. Foster, C.P.O.	6·67	..	3·93
42	Duncan	2nd	49·05	4	12″ B.L. IX.	13	5	0	2·61	1·00	28·99	F. Redman, C.P.O.	1·60	0·75	1·00
				12	6″ B.L. VII. (*b*)	63	36	10	7·12	4·41	52·39	E. R. Steventon, Gr., R.M.A.	6·45	3·88	4·41

43	Britannia	1st	48·77	4	12″ B.L. IX.	14	7	0	3·57	2·04	52·45	J. Pain, P.O. (1)	2·61	1·66	2·04
				4	9·2″ B.L. X.	20	13	1	3·44	2·33	48·35	C. L. C. B. Whyte, P.O. (1)	3·90	3·24	2·33
				10	6″ B.L. XI.	49	28	2	6·58	3·84	48·19	E. J. Morris, Lce.-Sergt., R.M.A.	7·23	7·02	3·84
44	Achilles	1st	48·20	6	9·2″ B.L. X.	35	19	2	4·16	2·38	49·39	J. C. Martin, P.O. (1)	3·53	2·52	2·38
				4	7·5″ B.L.	22	12	0	5·05	2·80	46·42	E. E. Beard, L.S.	4·00	2·48	2·80
45	Queen	1st	47·98	4	12″ B.L. IX.	16	7	2	4·34	2·07	60·01	R. March, P.O. (1)	4·30	0·97	2·07
				12	6″ B.L. VII. (*b*)	67	30	7	8·15	3·87	45·98	W. H. Shaw, Pte., R.M.L.I.	7·50	4·65	3·87
46	Psyche	2nd	47·87	8	4″ Q.F.	46	24	1	10·41	5·49	47·87	T. Twohig, L.S.	10·17	3·50	5·49
47	Mars	1st	47·59	4	12″ B.L. VIII.	13	5	1	2·80	1·15	29·57	C. B. Distin, C.P.O.	1·01	1·52	1·15
				12	6″ Q.F.	67	41	2	6·06	3·71	50·60	J. Harris, A.B.	6·00	5·82	3·71
48	Minerva	1st	47·28	11	6″ B.L. VII. (*b*)	62	30	5	7·90	3·98	47·28	W. Ward, Sergt., R.M.L.I.	6·67	2·73	3·98
49	Swiftsure	1st	46·96	4	10″ B.L.	15	7	0	3·22	1·67	52·35	E. Baker, P.O. (1)	4·44	1·06	1 67
				14	7·5″ B.L.	76	40	4	4·95	2·74	45·43	F. Walsh, A.B.	5·17	2·16	2·74
50	Blanche	1st	46·85	10	4″ B.L.	47	28	1	8·06	4·85	46·85	G. A. Griggs, P.O.	6·86	..	4·85
51	Diana	1st	46·57	11	6″ B.L. VII. (*b*)	61	29	5	7·73	3·92	46·57	W. Adams, A.B.	9·23	3·69	3·92
52	Bellona	2nd	46·46	6	4″ B.L.	34	15	2	10·68	4·81	46·46	J. Osborne, A.B.	6·86	5·31	4·81
53	Algerine	2nd	45·87	4	4″ Q.F.	22	12	0	9·58	5·26	45·87	J. Shanahan, P.O. (2)	10·59	2·18	5·26
54	Hermes	1st	45·69	11	6″ Q.F.	63	31	9	6·23	3·35	45·69	W. Chandler, P.O. (1)	6·92	5·68	3·35
*55	King Edward VII.	—	45·52	4	12″ B.L. IX.	14	6	2	3·15	1·51	38·82	—	..	1·03	1·51
				4	9·2″ B.L. X.	23	15	0	4·03	2·63	54·57	R. Barber, L.S.	3·75	3·41	2·63
				10	6″ B.L. VII. (*a*)	47	25	4	6·62	3·64	43·24	G. A. Lewis, C.P.O.	6·53	2·03	3·64
55a	Superb	1st	45·25	10	12″ B.L. X.	40	17	4	3·92	1·76	45·25	G. H. Clapson, Bom., R.M.A.	1·68	2·40	1·76
56	Hindustan	2nd	45·00	4	12″ B.L. IX.	16	3	1	4·60	0·99	25·45	T. C. Lee, L.S.	0·82	2·34	0·99
				4	9·2″ B.L. X.	21	10	0	3·54	1·62	33·62	R. F. Lloyd, P.O. (1)	3·16	1·58	1·62
				10	6″ B.L. VII. (*a*)	55	33	1	7·41	4·50	53·46	J. Lindsay, Sergt., R.M.A.	8·37	3·75	4·50
57	Venus	1st	44·55	11	6″ B.L. VII. (*b*)	59	29	5	7·32	3·75	44·55	J. Evason, P.O. (2)	8·00	..	3·75
58	Speedwell	2nd	44·13	2	4·7″ Q.F.	12	5	2	7·94	3·65	44·13	J. Hoddell, L.S.	3·96	4·76	3·65
59	Neptune	1st	43·96	10	12″ B.L. XI.	36	15	7	3·43	1·71	43·96	C. E. Bounton, P.O. (1)	2·58	..	1·71
60	Shannon	2nd	43·79	4	9·2″ B.L. XI.	8	3	0	2·29	0·86	14·85	R. Gray, P.O. (1)	0·57	1·91	0·86
				10	7·5″ B.L.	55	32	1	5·08	2·99	49·57	H. Jarvis, L.S.	4·76	2·23	2·99
61	Venerable	2nd	43·06	4	12″ B.L. IX.	15	8	2	3·13	1·80	46·28	G. Woods, P.O. (2)	1·71	0·52	1·80
				12	6″ B.L. VII. (*b*)	66	30	6	7·42	3·58	42·53	A. Jameson, Pte., R.M.L.I.	6·00	2·49	3·58

(*a*) = [illegible] charge. (*b*) = [illegible] charge.

* Returns received too late for insertion in compiled list by Admiralty. † Ricochet hits counting [illegible]th hit. Not directly comparable with 1910.

Results of Test of Gunlayers with Heavy Guns—*continued.*

Order of Merit.	Ship.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Rounds.	Total Number of Hits. Direct.	Total Number of Hits. Ricochet.	Total Number of Rounds per minute.	Total Number of Hits per minute.	Points per Gun or Turret.	Best Shot in Ship.	Hits per minute by Best Shot.	Comparison with previous year. Hits per minute, 1910.	Comparison with previous year. Hits per minute, 1911.
62	Warrior	1st	43·01	6	9·2″ B.L. X.	33	17	5	3·66	2·07	42·95	A.A. Leworthy, P.O. (1)	3·47	2·29	†2·07
				4	7·5″ B.L.	21	11	1	4·82	2·60	43·11	C. Ferris, L.S.	4·88	3·26	2·60
63	Africa	1st	42·76	4	12″ B.L. IX.	12	4	1	2·79	1·00	25·71	A. Fagg, P.O. (1)	0·94	2·97	1·00
				4	9·2″ B.L. X.	22	15	0	4·20	2·80	58·10	V. Wilcox, Sergt., R.M.A.	3·95	2·68	2·80
				10	6″ B.L. XI.	52	23	2	7·01	3·19	40·03	H. Williams, P.O. (1)	5·58	2·93	3·19
64	Good Hope	1st	41·92	2	9·2″ B.L. X.	11	5	0	3·86	1·65	34·24	S. Hammond, P.O. (1)	2·53	..	1·65
				16	6″ B.L. VII. (*b*)	89	36	15	7·99	3·61	42·89	C. R. Cuff, A.B.	7·07	..	3·61
65	Collingwood	2nd	41·91	10	12″ B.L. XI.	39	17	5	3·51	1·63	41·91	R. Carter, L.S.	1·67	1·63	1·63
66	Speedy	1st	41·83	2	4·7″ Q.F.	12	5	2	7·43	3·46	41·83	W. J. Cockrell, P.O. (1)	4·04	1·50	3·46
67	Barham	1st	41·59	6	4·7″ Q.F.	30	17	0	6·07	3·44	41·59	E. Murphy, P.O. (1)	5·00	2·28	3·44
68	Lord Nelson	1st	41·53	4	12″ B.L. X.	16	2	2	3·88	0·63	16·20	F. Jezzard, P.O. (1)	0·76	3·23	0·63
				8	9·2″ B.L. XI.	32	16	0	5·59	2·82	48·70	G. Freeman, P.O. (1)	3·24	3·64	2·82
				2	9.2″ B.L. XI.	10	8	0	3·16	2·53	52·50	K. McLeod, L.S.	3·16	1·81	2·53
69	Formidable	1st	41·11	4	12″ B.L. IX.	14	3	1	2·85	0·68	19·71	F. Stephens, P.O. (1)	1·97	1·51	0·68
				12	6″ B.L. VII. (*b*)	64	31	4	7·42	3·76	44·67	H. H. Dovey, L.S.	6·48	2·85	3·76
70	Britomart	2nd	40·98	2	4″ Q.F.	12	5	1	10·74	4·70	40·98	E. Catt, C.P.O.	5·66	5·89	4·70
71	St. Vincent	2nd	40·88	10	12″ B.L. XI.	37	17	1	3·45	1·59	40·88	R. Bryant, Lce.-Sergt. R.M.A.	1·78	1·06	1·59
72	Leviathan	1st	40·28	2	9·2″ B.L. X.	11	3	0	3·58	0·98	20·34	P. S. V. Lakeman, P.O.	1·33	..	0·98
				16	6″ B.L. VII. (*b*)	90	38	13	7·67	3·60	42·77	J. Harper, Gnr., R.M.A.	7·40	..	3·60
73	Juno	1st	39·80	11	6″ B.L. VII. (*b*)	61	23	6	8·10	3·35	39·80	S. E. Tiney, L.S.	5·84	4·21	3·35
	Dido	1st	39·80	11	6″ B.L. VII. (*b*)	58	25	8	7·11	3·35	39·80	F. M. Ford, P.O.	5·33	3·59	3·35
75	Defence	1st	39·72	4	9·2″ B.L. XI.	11	6	1	3·15	1·80	31·09	S. Marsh, P.O. (1)	1·71	1·16	1·80
				10	7·5″ B.L.	54	26	1	5·06	2·50	41·45	F. Morgan, P.O. (1)	4·96	3·35	2·50
76	Leda	1st	39·41	2	4·7″ Q.F.	11	5	1	6·75	3·26	39·41	S. Gilbard, C.P.O.	3·75	3·86	3·26
77	Aboukir	1st	38·82	2	9·2″ B.L. X.	11	2	1	3·58	0·73	15·15	F. W. Potter, P.O. (1)	1·45	0·79	0·73
				12	6″ B.L. VII. (*b*)	60	30	7	6·71	3·60	42·77	C. Hemmings, A.B.	7·47	3·69	3·60
78	Vanguard	2nd	38·31	10	12″ B.L. XI.	40	15	2	3·80	1·49	38·31	J. Webster, P.O. (1)	1·55	1·04	1·49

79	Clio	1st	38·28	6	4" Q.F.	34	14	1	10·52	4·39	38·28	W. A. Gibling, L.S.	7·82	2·86	4·39
80	Media	1st	38·20	6	4·7" Q.F.	30	15	0	6·24	3·16	38·20	J. Inett, P.O. (1)	5·65	2·62	3·16
81	Diamond	2nd	37·76	12	4" Q.F.	68	28	1	10·39	4·33	37·76	J. Tilsey, Sgt., R.M.L.I.	7·74	4·81	4·33
82	Bulwark	1st	37·74	4	12" B.L. IX.	12	5	0	2·40	1·00	28·99	S. Parry, P.O. (1)	3·20	2·80	1·00
				12	6" B.L. VII. (*b*)	64	28	2	7·48	3·30	39·20	J. Irwin, Pte., R.M.L.I.	6·67	2·96	3·30
83	Berwick (*New Commission*)	1st	36·83	12	6" B.L. VII. (*b*)	56	27	3	6·22	3·10	36·83	A. Fountain, P.O. (1)	6·67	2·79	3·10
84	Prince George	1st	36·38	4	12" B.L. VIII.	10	1	0	2·07	0·21	5·40	J. Vincent, L.S.	0·41	0·83	0·21
				11	6" Q.F.	58	30	2	5·65	3·08	42·01	G. Congdon, C.P.O.	8·18	4·09	3·08
85	New Zealand	1st	36·22	4	12" B.L. IX.	14	3	0	2·90	0·62	15·94	F. Waller, P.O. (2)	0·83	2·05	0·62
				4	9·2" B.L. X.	22	14	1	3·68	2·39	49·59	E. Bradley, Lce.-Sgt., R.M.A	3·47	2·25	2·39
				10	6" B.L. VII. (*a*)	49	21	1	6·69	2·94	34·93	E. Goodyear, Corpl., R.M.A.	6·00	2·62	2·94
86	Seagull	3rd	35·91	2	4·7" Q.F.	11	4	1	7·62	2·97	35·91	E. Belcher, C.P.O.	3·54	3·68	2·97
87	Bristol	1st	35·68	2	6" B.L. XI.	10	3	1	6·67	2·20	27·61	W. J. Hamilton, P.O. (1)	2·67	..	2·20
				10	4" B.L.	46	21	5	7·89	3·86	37·29	J. Walker, Lt.-Corpl. R.M.L.I.	8·57	..	3·86
88	Blonde	1st	35·65	10	4" B.L.	47	21	1	8·12	3·69	35·65	A. Page, L.S.	6·86	..	3·69
89	Isis	1st	35·16	11	6" B.L. VII. (*b*)	56	22	7	6·86	2·96	35·16	C. Nethercott, A.B.	4·33	4·45	2·96
90	Doris	2nd	34·69	11	6" B.L. VII. (*b*)	58	20	7	7·48	2·92	34·69	W. Crocker, P.O. (1)	6·17	3·09	2·92
91	Euryalus	1st	33·83	2	9·2" B.L.	10	3	1	3·16	1·04	21·58	D. Sheppard, P.O. (1)	1·26	..	1·04
				12	6" B.L. VII. (*b*)	58	25	4	6·66	3·02	35·88	G. H. Thomas, P.O. (1)	5·73	..	3·02
92	Cambrian	2nd	33·67	2	6" Q.F.	11	6	1	5·66	3·23	44·06	J. T. Patey, Act. C.P.O.	3·30	1·25	3·23
				8	4·7" Q.F.	47	14	4	7·80	2·57	31·07	G. H. Mayne, L.S.	4·95	2·25	2·57
93	Gossamer	1st	33·37	2	4·7" Q.F.	11	4	2	6·60	2·76	33·37	J. Donovan, L.S.	4·32	..	2·76
	Dryad	1st	33·37	2	4·7" Q.F.	10	4	2	6·00	2·76	33·37	A. E. Porter, L.S.	2·76	..	2·76
95	Berwick	1st	33·15	12	6" B.L. VII. (*b*)	62	22	10	7·02	2·79	33·15	W. H. Tapsell, P.O. (1)	5·41	..	2·79
96	Pegasus	2nd	32·92	8	4" Q.F.	44	16	1	10·26	3·89	32·92	H. Cordner, L.S.	6·43	..	3·89
97	Pioneer	2nd	32·79	8	4" Q.F.	41	16	1	9·25	3·76	32·79	H. Jeffries, P.O. (1)	8·90	3·60	3·76
98	Pyramus	2nd	32·61	8	4" Q.F.	44	16	1	10·06	3·74	32·61	H. Dowling, A.B.	8·82	3·83	3·74
99	Cochrane	1st	32·31	6	9·2" B.L. X.	29	13	3	3·06	1·46	30·30	T. Prebble, C.P.O.	2·53	2·39	1·46
				4	7·5" B.L.	21	9	3	4·68	2·13	35·32	C. Allison, P.O. (1)	3·69	2·14	2·13
100	King Alfred	1st	32·20	2	9·2" B.L.	12	5	3	3·91	1·92	39·84	R. Long, P.O. (1)	2·60	..	1·92
				16	6" B.L. VII. (*b*)	83	27	9	7·25	2·63	31·24	T. Emmanuel, Sergt. R.M.A.	7·07	..	2·63
101	Thistle	2nd	31·83	2	4" Q.F.	11	4	0	9·88	3·65	31·83	F. Trevethan, C.P.O.	5·59	4·28	3·65

(*a*) = ¾ charge. (*b*) = ½ charge.

† Ricochet hits counting $\frac{3}{10}$th hit. Not directly comparable with 1910.

Results of Test of Gunlayers with Heavy Guns—*continued.*

Order of Merit.	Ship.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Total Number of: Rounds.	Hits. Di-rect.	Hits. Rico-chet.	Rounds per minute.	Hits per minute.	Points per Gun or Turret	Best Shot in Ship.	Hits per minute by Best Shot.	Comparison with previous year. Hits per minute, 1910.	Comparison with previous year. Hits per minute, 1911.
102	Melpomene	2nd	31·45	2	6″ Q.F.	12	3	1	7·92	2·15	29·33	E. Rawlinson, Pte., R.M.L.I.	2·94	3·90	† 2·15
				6	4·7″ Q.F.	35	11	0	8·10	2·66	32·16	W. Rothwell, P.O. (1).	5·29	2·49	2·66
103	Hibernia	1st	31·08	4	12″ B.L. IX.	15	3	1	3·26	0·71	18·25	E. P. Pring P.O. (1)	0·97	0·86	0·71
				4	9·2″ B.L. X.	19	10	1	3·10	1·71	35·48	T. J. Johnson, L.S.	3·49	2·14	1·71
				10	6″ B.L. XI.	45	19	0	6·01	2·54	31·88	J. H. Moffatt, L.S.	6·67	2·20	2·54
104	Dreadnought	1st	30·59	10	12″ B.L. X.	39	12	5	3·40	1·19	30·59	J. M. Waller, P.O. (1).	1·36	1·75	1·19
105	Triumph	1st	30·02	4	10″ B.L.	15	3	2	3·58	0·81	25·39	J. T. Warren, P.O. (1)	1·85	0·28	0·81
				14	7·5″ B.L.	67	29	5	4·15	1·89	31·34	G. Jenks, P.O. (1)	3·43	2·23	1·89
106	Hampshire	1st	30·00	4	7·5″ B.L.	18	9	1	4·11	2·17	35·98	W. Nicholson, C.P.O.	4·40	2·55	2·17
				6	6″ B.L. VII. (*a*)	31	8	5	7·18	2·19	26·02	J. Cooper, Corporal, R.M.L.I.	5·33	2·75	2·19
107	Donegal	1st	29·82	12	6″ B.L. VII. (*b*)	60	20	4	6·91	2·51	29·82	W. E. Russell, Pte., R.M.L.I.	6·86	..	2·51
108	Furious	1st	29·74	10	6″ Q.F.	52	21	2	5·25	2·18	29·74	C. S. Wake, C.P.O.	5·00	2·06	2·18
109	Essex	1st	29·58	12	6″ B.L. VII. (*b*)	68	20	7	7·70	2·49	29·58	H. Burns, L.S.	6·67	..	2·49
110	Lancaster	2nd	29·22	12	6″ B.L. VII. (*b*)	57	18	13	6·38	2·46	29·22	G. Wardell, Corporal, R.M.L.I.	5·33	2·84	2·46
111	Bellerophon	1st	29·05	10	12″ B.L. X.	31	12	5	2·60	1·13	29·05	W. Jackson, Bomb., R.M.A.	1·24	2·32	1·13
112	Albemarle	1st	27·82	4	12″ B.L. IX.	14	4	1	2·99	0·94	27·25	J. Corfe, L.S.	2·64	0·40	0·94
				12	6″ B.L. VII. (*b*)	63	20	2	7·14	2·35	27·92	B. Wright, Sergeant, R.M.L.I.	4·80	1·72	2·35
113	Indefatigable	1st	27·51	8	12″ B.L. X.	28	10	0	3·02	1·07	27·51	J. Brace, P.O.	1·66	..	1·07
114	Carnarvon	1st	26·38	4	7·5″ B.L.	19	7	3	4·11	1·71	28·35	F. Chapman, C.P.O.	2·65	1·74	1·71
				6	6″ B.L. VII. (*a*)	32	9	0	7·64	2·11	25·07	A. Skedgell, P.O. (1)	2·96	2·22	2·11

115	Roxburgh	1st	26·27	4	7·5″ B.L.	23	8	2	5·20	1·94	32·17	P. G. Pearce, P.O. (1)	2·57	0·86	1·94
				6	6″ B.L. VII. (*a*)	28	7	3	6·51	1·88	22·33	J. Reynolds, Pte., R.M.L.I.	4·22	4·13	1·88
116	Prometheus	1st	25·38	8	4″ Q.F.	39	13	1	8·48	2·91	25·38	E. G. Cowles, A.B.	6·86	3·56	2·91
117	Pandora	1st	24·07	8	4″ Q.F.	36	12	1	8·04	2·76	24·07	W. Bragg, Pte., R.M.L.I.	7·84	2·50	2·76
	Shearwater	1st	24·07	6	4″ Q.F.	30	9	1	8·78	2·76	24·07	A. W. Solley, A.B.	7·27	2·87	2·76
119	Eclipse	1st	23·09	5	6″ Q.F.	24	9	1	5·08	1·97	26·87	G. Mayo, A.B.	3·00	3·73	1·97
				6	4·7″ Q.F.	34	7	1	7·77	1·65	19·95	W. Miller, L.S.	3·60	4·28	1·65
120	Boadicea	1st	20·96	6	4″ B.L.	27	7	2	7·71	2·17	20·96	E. Smith, P.O. (1)	6·86	2·57	2·17
121	Hercules	1st	20·05	10	12″ B.L. XII.	35	7	5	3·23	0·78	20·05	J. Reeve, P.O. (1)	0·83	..	0·78
122	Invincible	1st	19·54	8	12″ B.L. X.	26	6	4	2·74	0·76	19·54	J. Smithen, P.O. (1)	0·88	1·24	0·76
123	Bramble	2nd	19·45	2	4″ Q.F.	11	2	2	9·43	2·23	19·45	A. Hanson, P.O. (1)	2·23	2·57	2·23
124	Forte	1st	15·41	2	6″ Q.F.	11	3	0	5·50	1·50	20·46	W. H. Bentley, P.O. (2)	3·00	2·50	1·50
				8	4·7″ Q.F.	45	7	1	7·24	1·17	14·15	C. T. Cornish, C.P.O.	2·50	4·40	1·17
125	Halcyon	1st	14·51	2	4·7″ Q.F.	10	2	0	6·00	1·20	14·51	S. H. E. Bull, P.O.	2·40	3·45	1·20
126	Amethyst	1st	12·99	12	4·7″ Q.F.	57	10	0	8·47	1·49	12·99	A. Curry, P.O.	5·14	3·98	1·49
*127	Harrier	..	9·43	2	4·7″ Q.F.	10	1	1	6·00	0·78	9·43	A. S. Cranmer, A.B.	1·20	..	0·78
127a	Spanker	1st	0·00	2	4·7″ Q.F.	11	0	0	7·00	0·00	0·00	W. Barrow, A.B.	0·00	1·21	0·00

(*a*) = $\frac{2}{3}$ charge. (*b*) = $\frac{1}{2}$ charge.

* Return received too late for insertion in compiled list by Admiralty.

† Ricochet hits counting $\frac{1}{10}$th hit. Not comparable with 1910.

Ricochet hits counting three-tenths hit. Not directly comparable with 1910.

Gun.	Best Ship.	Total Number of				Average per minute.	
		Guns.	Rounds.	Hits. Direct.	Hits. Rico-chet.	Rounds.	Hits.
12-in.	Russell (Mediterranean) .	2*	15	9	0	3·93	2·31
Totals 1911. . .		106*	742	260	70	3·08	1·15
,, 1910. . .		102*	706	314	54	3·02	1·44
Difference . . .		+4	+36	−54	+16	+0·06	−0·29
9·2-in., (Double Gun Turret)	Minotaur (China) . . .	2*	15	10	1	4·82	3·34
Totals 1911. . .		10*	66	35	2	3·96	2·21
,, 1910. . .		14*	106	54	8	4·85	2·62
Difference . . .		−4	−40	−19	−6	−0·89	−0·41
9·2-in., Marks X. & XI. (Single Turrets)	Dominion (Home, 2nd Div.)	4	24	20	1	4·95	4·19
Totals 1911. . .		80	438	240	32	3·83	2·08
,, 1910. . .		80	444	247	28	3·93	2·28
Difference . . .		Nil	−6	−7	+4	−0·10	−0·20
7·5-in.	Minotaur (China) . . .	10	60	39	4	8·01	5·53
Totals 1911. . .		94	507	261	30	5·18	2·78
,, 1910. . .		98	517	244	28	5·11	2·61
Difference . . .		−4	−10	+17	+2	+0·07	+0·17
6-in., Mark XI. . . .	Glasgow	2	12	9	0	8·39	6·33
Totals 1911. . .		64	323	160	15	6·96	3·62
,, 1910. . .		50	233	128	9	6·50	3·77
Difference . . .		+14	+90	+32	+6	+0·46	−0·15
6-in., Marks VII. & VIII.	Monmouth (China) . . .	12	67	45	4	8·95	6·33
Totals 1911. . .		518	2787	1375	262	7·57	3·98
,, 1910. . .		453	2266	1046	172	6·91	3·48
Difference . . .		+65	+521	+329	+90	+0·66	+0·50
6-in. Q.F.	Flora (China)	2	12	9	1	8·75	6·82
Totals 1911. . .		164	934	547	51	6·58	3·79
,, 1910. . .		179	1002	634	41	6·43	4·07
Difference . . .		−15	−68	−87	+10	+0·15	−0·28
4·7-in. Q.F. . . .	Flora (China)	8	48	30	1	9·14	5·88
Totals 1911. . .		80	452	182	23	7·43	3·10
,, 1910. . .		102	571	245	27	7·51	3·35
Difference . . .		−22	−119	−63	−4	−0·08	−0·25
4-in. Q.F.	Sapphire (Home, 3rd Div.).	12	69	46	0	11·04	7·43
Totals 1911. . .		172	937	440	36	9·93	4·55
,, 1910. . .		134	739	336	38	9·81	4·26
Difference . . .		+38	+198	+104	−2	+0·12	+0·29
4-in. B.L.	Newcastle	10	56	37	1	10·20	6·85
Totals 1911. . .		202	1004	430	47	8·83	4·03
,, 1910. . .		120	593	266	29	9·02	4·27
Difference . . .		+82	+411	+164	+18	−0·19	−0·24

* Turrets.

12-in., 1 run of $2\frac{5}{13}$ mins. or 2 runs of $1\frac{1}{4}$ mins. per turret. 9·2-in. (Double gun turret), 1 run of $1\frac{3}{4}$ mins. per turret.
9·2-in., Marks X. and XI. (Single turrets), 1 run of $1\frac{7}{15}$ mins. 7·5-in., 1 run of $1\frac{1}{6}$ mins.
6-in., Marks XI., VII., and VIII., 1 run of $\frac{3}{4}$ min.
6-in. Q.F., 1 run of 1 min. 4·7-in. Q.F., 1 run of $\frac{5}{6}$ min. 4-in. Q.F. and B.L., 1 run of $\frac{7}{15}$ min.

Abstract of Results of Battle Practice in H.M. Fleet, 1911.

The conditions of the practice differed considerably from those of former years, so that no comparison can be made.

Order of Merit.	Fleet.	No. of Ships.	No. of Guns.	Average Points.	First Ship in Fleet.	Score.
1	Australia	3	37	257·42	ENCOUNTER . .	446·0
2	China	6	74	182·17	Minotaur . . .	273·9
3	Atlantic Fleet and 5th Cruiser Squadron	9	146	158·31	Formidable . . .	331·7
4	Home Fleet, 1st Battle and 1st Cruiser Squadrons	15	146	142·11	*Collingwood . .	285·1
5	Mediterranean Fleet and 6th Cruiser Squadron . . .	7	114	113·87	Exmouth . . .	296·7
6	Home Fleet, 3rd Division . . .	18	256	112·56	Antrim	225·9
7	Home Fleet, 2nd Battle and 2nd Cruiser Squadrons	13	156	101·01	Dominion . . .	208·7
	Totals and averages	71	929	133·20		

* Fired inside range on Run 2.

Fired at a Fixed Target.

—	Cape of Good Hope .	4	41	266·8	Pandora . . .	387·8

Austro-Hungarian Navy Estimates, 1911-12.

(Converted at £1 = 24 Kronen.)

Heads of Expenditure.	Estimates, 1912-13.	Estimates, 1911-12.
ORDINARY ESTIMATES.	Not available up to time of going to press.	£
Pay of Officers, etc.		248,377
Pay and Clothing—petty officers and seamen		243,334
Land Service		122,336
Sea Service		355,380
Shore Establishments		35,643
Maintenance of Fleet		494,913
New Construction, viz. :—		
(A) Hulls and Machinery: Battleship Erzherzog Franz Ferdinand, 14,500 tons		137,500
(A) Hulls and Machinery: Battleship Radetsky, 14,500 tons		179,166
(A) Hulls and Machinery: Battleship Zrinyi, 14,500 tons		166,666
(A) Hulls and Machinery: Cruiser Admiral Spaun, 3,500 tons		8,333
(A) Hulls and Machinery: 12 Torpedo-boats, 100 tons		12,500
(B) Guns, torpedo fittings, &c., for above-named vessels		329,166
Guns and Small Arms		148,375
Miscellaneous		208,410
		2,690,099
Less Special Receipts		16,666
Total of Ordinary Estimates		2,673,433
EXTRAORDINARY ESTIMATES.		
Pay and Clothing, &c.		2,083
Shore Establishments, Charts, etc.		458
Floating-Dock		—
Large Alterations, Kaiserin M. Theresia, Erzherzog Albrecht, Habsburg, Lussin, Huszar and Floating Dock for Destroyers and Torpedo-boats		47,500
Guns and Small Arms, Torpedo Fittings, Mines, &c.		27,500
Buildings		90,008
Miscellaneous		3,066
		2,844,048
SINGLE EXTRAORDINARY ESTIMATE FOR THE YEAR 1911.		
Extraordinary Estimate for Final Development of the Fleet		2,291,666
		£5,135,714

French Navy Estimates, 1912.

(Converted at £1 = 25 francs.)

Cap. in Estimates, 1912.	Heads of Expenditure.	Credits voted for 1912.	Credits voted for 1911.
	SECTION I.		
	General Expenses of Administration—Maintenance of the Navy.	£	£
1, 2, 3, 4	Admiralty Office	182,064	177,022
5, 6	Hydrographic Department	29,288	30,079
7	Inspection of Administrative Services	12,780	13,091
8, 9, 10, 11	Navy Pay, Officers and Men; Mess Allowance, Officers	2,657,712	2,570,287
12, 13	Justice and Police	101,725	100,459
14	Commissariat Staff	54,321	49,262
15, 16, 17	Storekeeper's Department — Wages and Materials	1,004,145	972,583
18, 19	Victualling Department — Wages and Materials	907,155	827,718
20, 21, 22	Medical and Hospitals	199,949	187,650
23	Constructors' Staff	210,253	202,299
24, 26	Shipbuilding—Maintenance and repair of Fleet; Wages	562,120	528,708
25, 27	Shipbuilding—Maintenance and repair of Fleet; Materials	783,387	751,120
28	Ordnance Staff	80,340	76,180
29, 31	Guns—Repairs and improvements, &c.; Wages	175,664	168,978
30, 32	Guns—Repairs and improvements, &c.; Materials	672,767	691,954
33, 34, 35	Hydraulic and other Works	161,152	154,237
36	Administrative Staff	185,035	164,508
37	Travelling and lodging allowances	148,909	151,744
38	Charitable and subscriptions	107,298	71,053
39	Pay of Reserve Officers	38,914	35,497
40	Secret Service	4,000	4,000
	SECTION II.		
41–45	Mercantile Marine and Fisheries	132,911	121,263
46	Pensions	662,132	619,192
	Carried forward	£9,074,084	£8,698,882

French Navy Estimates—*continued.*

Cap. in Estimates, 1912.	Heads of Expenditure.	Credits voted for 1912.	Credits voted for 1911.
		£	£
	Brought forward . .	9,074,084	8,698,882
	SECTION III. *New Construction, Guns, Works.*		
47	Sundry Stores	347,297	48,880
48	Shipbuilding in Dockyards—Wages .	426,800	547,240
49	,, ,, Materials .	1,447,529	1,988,000
50	,, by Contract . . .	2,319,440	2,531,200
51	Torpedoes and Mines	340,000	219,000
52	Machinery, large tools, and workshops .	449,360	358,280
53	New guns and renewals—Wages . .	111,816	110,665
54	,, ,, Materials . .	1,582,987	1,461,094
55	,, machinery, tools, and workshops	127,960	80,100
56–58	New Works, including defence of military ports and bases of operations . .	703,876	611,280
		£16,931,149	£16,654,621

Programme of New Construction, to be continued or undertaken in 1912.—Building in Dockyards.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1912.
					£	£
Battleships	Jean Bart	Brest	1910	1913	2,487,170	825,915
	Courbet	Lorient	1910	1913	2,439,450	737,720
	Mirabeau	,,	1908	1911	2,049,373	51,000
	Waldeck-Rousseau	,,	1906	1911	1,442,378	10,920
Torpedo-boat Destroyers	Enseigne Henry	Rochefort	1910	1912	166,417	32,827
	Aspirant Herbert	,,	1910	1912		
	Bisson	Toulon	1911	1913	248,353	111,955
	Renaudin	,,	1911	1913		
	Protet (*ex* M 83)	Rochefort	1911	1914	130,919	56,791
	Commandant Lucas (*ex* M 78)	Toulon	1911	1914	137,106	68,879
32 Submarines	Brumaire	Cherbourg	1909	1912		
	Frimaire	,,	1909	1912	221,584	14,232
	Nivôse	,,	1909	1912		
	Foucault	,,	1910	1912		
	Euler	,,	1910	1912	126,269	61,960
	Franklin	,,	1910	1912		
	Mariotte	,,	1908	1912	115,611	5,800
	Faraday	Rochefort	1909–10	1911–12		
	Volta	,,	1909–10	1911–12	299,244	49,200
	Newton	,,	1910	1912		
	Montgolfier	,,	1910	1912		
	Amiral Bourgois	,,	1908	1912	115,642	19,600
	Bernoulli	Toulon	1908–9	1911–12		
	Joule	,,	1908–9	1911–12		
	Coulomb	,,	1908–9	1911–12	489,872	112,350
	Arago	,,	1908–9	1911–12		
	Curie	,,	1908–9	1911–12		
	Le Verrier	,,	1908–9	1911–12		
	Charles Brun	,,	1908	1911	106,360	726
	Clorinde (*ex* Q 90)	Rochefort	1911	1913	148,408	63,114
	Cornélie (*ex* Q 91)	,,	1911	1913		
	Gustave Zédé (*ex* Q 92)	Cherbourg	1911	1913	307,613	140,295
	Néréide (*ex* Q 93)	,,	1911	1913		
	Q 94 and Q 95	Rochefort	1912	1914	154,568	47,126
	Q 96 to Q 99	Toulon	1913	1914	338,105	82,100
	Q 100 and Q 101	Cherbourg	1913	1914	152,047	43,430
	Q 102	Rochefort	1913	1914	95,430	18,100
	Total building in Dockyards		..	..	£11,861,952	2,557,310

Programme of New Construction, to be continued or undertaken in 1912.—Building by Contract.

Class.	Names of Ships.	Where Building and to be Completed.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1912.
					£	£
Battleships	Voltaire	La Seyne—Toulon	1906	1911	2,216,579	122,280
	Condorcet	St. Nazaire—Brest	1906	1911	2,214,933	119,680
	Diderot	„ „	1906	1911	2,229,788	123,280
	Vergniaud	Bordeaux—Toulon	1906	1911	2,209,892	103,480
	France (ex A 3)	—	1911	1914	2,524,970	867,768
	Paris (ex A 4)	—	1911	1914	2,524,970	867,768
Torpedo-boat Destroyers	Dague	Bordeaux—Lorient	1911	1914	111,290	32,190
	Faulx	Nantes—Lorient	1911	1912	110,838	23,760
	Boutefeu	Bordeaux—Lorient	1911	1911	107,964	7,080
	Bouclier	Le Havre—Cherbourg	1911	1911	120,344	8,600
	Capitaine Mehl	St. Nazaire—Lorient	1912	1912	124,692	55,920
	Dehorter	St. Nazaire—Cherbourg	1912	1912	125,028	55,472
	Francis Garnier	Cherbourg	1912	1912	127,556	57,992
	Commandant Bory	Lorient	1912	1912	120,764	47,280
	Commandant Rivière	„	1912	1912	120,252	47,080
	Magon (ex M 79)	„	1913	1913	125,147	36,667
	Mangini (ex M 80)	Toulon	1913	1913	124,031	36,667
Mine-layers	Pluton	Cherbourg	1911	1912	73,065	28,297
	Cerbère (ex A 2)	„	1912	1912	59,745	44,545
Transport	T	—	1912	1912	63,719	32,000
Total building by Contract					£15,435,567	2,717,806

German Navy Estimates, 1912.

(Converted at £1 = 20·43 marks.)

Ordinary Permanent Estimates.

Heads of Expenditure.	Estimates for the financial year 1912.	Granted for the financial year 1911.
	£	£
Imperial Navy Office	115,960	111,651
Admiral Staff	17,521	16,091
Look-out Stations and Observatories	21,240	20,450
Station Superintendencies	43,841	42,532
Administration of Justice	10,727	10,544
Naval Chaplains and Garrison Schools	10,285	9,940
Navy Pay	2,037,400	1,910,010
Maintenance of Ships in Commission	2,472,396	2,300,245
Victualling	157,162	141,380
Clothing	28,503	24,370
Garrison Works and Administration	70,083	65,142
,, Building Materials	46,730	45,328
Lodging Allowance	207,709	204,073
Medical Department	164,040	158,618
Travelling Expenses, Freight Charges, &c.	207,866	196,808
Training Establishments	31,126	27,904
Maintenance of Fleet and Docks	1,810,310	1,779,725
Ordnance and Fortification	1,038,550	922,886
Accountants' Department	60,995	58,233
Pilotage, Coastguard, and Surveying Service	41,681	42,684
Miscellaneous Expenses	104,391	87,918
Administration of Kiau-chau Protectorate	7,619	7,800
Total of Ordinary Permanent Estimates carried to Summary, next page	8,709,135	8,184,392

German Navy Estimates—*continued.*

SPECIAL ORDINARY ESTIMATES.

Shipbuilding Programme for the Financial Year 1912.

For the Construction of—		£
Battleship Oldenburg	final instalment	230,054
" Kaiser (Ersatz Hildebrand)	" "	367,102
" Friedrich-der-Grosse (Ersatz Heimdall)	" "	367,102
Large cruiser Goeben (II.)	" "	252,099
Battleship Kaiserin (Ersatz Hagen)	3rd instalment	440,529
" Ersatz Ægir	" "	440,529
" Ersatz Odin	" "	440,529
Large cruiser (J)	" "	416,055
Small cruiser Stralsund (Ersatz Cormoran)	final instalment	73,420
" Strasburg (Ersatz Condor)	" "	73,420
Torpedo nets	" "	106,706
Battleship Ersatz Kurfürst Friedrich Wilhelm	2nd instalment	513,954
" Ersatz Weiszenburg	" "	513,954
" S	" "	513,954
Large cruiser K	" "	538,420
Small cruiser, Ersatz Seeadler	" "	122,370
" Ersatz Geier	" "	122,370
Battleship, Ersatz Brandenburg	1st instalment	269,210
Large cruiser, Ersatz Kaiserin Augusta	" "	244,738
Small cruiser Ersatz Irene	" "	122,370
" Ersatz Prinzess Wilhelm	" "	122,370
Salvage Ship for sunken vessels	" "	73,420
Torpedo-boat division	final instalment	318,160
" "	1st instalment	416,055
Submarines, construction and experiments		734,216
Alteration and improvement of battleships		48,948
" " large cruisers		24,474
Total		£7,906,508

SUMMARY.

Heads of Expenditure.	Estimates for the financial year 1912.	Granted for the financial year 1911.
	£	£
Ordinary Permanent Estimates	8,709,135	8,184,392
New Construction and Alterations	7,906,508	7,907,490
Armaments, Torpedoes, and Mines	3,881,057	4,335,440
*Other items	1,512,046	668,610
Total	£22,008,746	21,095,932

* Including improvement of docks at Wilhelmshaven, Kiel, and Dantzig, coast fortifications and other buildings on North Sea and Baltic coasts, harbour for small vessels at Heligoland, &c.

Italian Navy Estimates, 1912-13.

FINANCIAL YEAR 1ST JULY, 1912, TO 30TH JUNE, 1913.

(Converted at £1 = 25 lire.)

Heads of Expenditure.	Estimates, 1912-1913.	Revised Estimates, 1911-1912.
ORDINARY GENERAL EXPENDITURE.	£	£
Admiralty	87,240	74,396
Pensions	396,900	346,300
Expenditure on the Mercantile Marine for subsidies, &c.	990,817	814,096
Total	£ 1,474,957	1,234,792
ORDINARY EXPENDITURE FOR NAVAL SERVICES.	£	£
General Staff of the Navy	175,600	179,600
Corps of Engineers	77,200	77,720
Medical Service	35,600	35,720
Commissariat Service	38,400	38,560
Pay of Officers, and Wages and Clothing of Men	744,920	628,716
Gratuities, &c.	208,000	168,000
Forts—*Personnel*	18,480	17,680
Telegraph Service—*Personnel*	16,000	15,160
,, ,, *Matériel*	6,880	6,560
Police (Dockyards)	13,600	13,260
Salaries and Travelling Expenses	48,400	42,408
Barracks, Maintenance, Lighting, etc.	10,400	10,400
Rents and Water Royalties	3,000	3,000
Ships fitting out, &c.	380,000	306,504
Fuel and Stores for Ships in Commission	363,000	337,000
Victualling	504,000	422,536
Hospital Services	31,800	28,600
Naval College and Engineering School	13,640	18,668
Scientific Services—*Personnel*	7,600	7,600
,, ,, *Matériel*	5,360	6,360
Wireless Telegraph Stations, Benadir and Eritrea, and School of Telegraphy, Rome	14,000	12,000
Workshops, Fortifications, and Stores—*Personnel*	74,400	74,918
Technical Department (Civil)—*Personnel*	39,520	39,320
Naval Constructors	32,600	25,720
Office Expenses and Civil Staff	8,900	8,820
Law Charges	1,344	1,344
Transport of Materials	9,600	8,600
Works Department—Repairs	95,800	95,820
Plant, Machinery and Tools; Reconstruction and maintenance of Workshops	70,000	70,000
Electric Power, Fuel and Stores for Shore Establishments	81,600	69,600
Materials for construction of new Ships and maintenance of existing Ships—Hulls, Machinery, and Armaments	2,400,000	2,311,302
Expenditure under law of 27th June, 1909, not relating to shipbuilding	—	400,000
Wages and Expenses of Dockyard employés	780,800	740,800
Guns, Torpedoes and Small Arms	130,800	121,800
Supernumerary Labour in Dockyards	—	32,000
Coast Defence—*Matériel*	12,000	12,000
Adaptation of Mercantile Auxiliaries	—	1,000
Reserve Fund	20,000	20,000
Total (to next page)	£ 6,473,244	6,445,126

The Estimates for 1912-13 provide for the continuation of battleships Dante Alighieri, Conte di Cavour, Giulio Cesare, Leonardo da Vinci, and various subsidiary vessels.

ITALIAN NAVY ESTIMATES—*continued.*

Heads of Expenditure.	Estimates, 1912–1913.	Revised Estimates, 1911–1912.
EXTRAORDINARY EXPENDITURE.	£	£
Temporary Civil Staff	4,800	6,820
General Expenses and Half Pay	3,800	2,200
Repair of buildings at Messina and Reggio	—	6,000
Wireless Telegraphy, instalments ashore	—	5,000
Total £	8,600	20,020
SUMMARY.	£	£
Ordinary General Expenditure	1,474,957	1,234,792
,, Expenditure for Naval Services	6,473,244	6,445,126
Extraordinary Expenditure	8,600	20,020
Rent of Lands occupied by Government	108,940	108,670
Lighthouses and Buoys	32,400	—
Supplementary Fund, for Shipbuilding	177,303	—
Purposes other than Shipbuilding	400,000	—
Grand Total £	8,675,444	7,808,608

Japanese Navy Estimates, 1912–1913.

Financial Year, 1st April to 31st March.

(9·8 Yen taken as equal to £1.)

ORDINARY EXPENDITURE.	Estimates, 1912–1913.	Voted, 1911–1912.
Vote.	£	£
1. Admiralty	19,824	19,824
2. Pay and Allowances	1,289,633	1,242,788
3. Offices	44,956	45,039
4. Repairs to Buildings	26,390	26,390
5. Travelling	66,297	63,582
6. Miscellaneous	33,489	33,510
7. Allowances to Cadets and Petty Officers for Clothing	33,616	39,252
8. Clothing and Provisions	695,329	728,951
9. Shipbuilding, Armaments, and Repairs *	1,167,784	1,168,008
10. Manœuvres	30,020	29,271
11. Hospital Expenses	24,459	26,495
12. Naval Harbours	37,893	39,887
13. Maintenance of Ships, Dockyards, etc.	624,778	621,846
14. Family Allowances to Petty Officers and Men	32,876	32,876
15. Prisoners	644	644
16. Hydrographic Service	24,776	27,386
17. Salaries to Foreigners	2,086	1,433
18. Secret Service	8,167	8,167
19. Maintenance	2,042	2,042
20. Law Costs, Compensation Claims, Bonuses, etc.	1,545	2,133
	£4,166,604	£4,159,524
EXTRAORDINARY EXPENDITURE.		
Vote.	£	£
1. New Works and Repairs	10,132	60,369
2. Chinkai Naval Station (3rd instalment)	71,458	55,794
3. Repairs in Naval Dockyards to Ships not belonging to Navy	21,671	21,671
4. Naval Works Department	5,089	5,089
5. Production of Charts	1,531	1,531
6. Armaments Replenishing Fund	5,086,014	4,462,286
7. Magazine Cooling Arrangements	30,625	30,625
8. Renewing guns, small arms and torpedoes at educational establishments	19,269	..
9. Battle Practice Targets	7,172	..
10. Entertaining Foreign guests at Grand Manœuvres	2,042	..
11. Investigation of Aeronautics	10,210	..
— Making Naval Grounds in Korea	..	3,063
— Salving parts of the Matsushima	..	3,036
— Cruise of the Kurama and Tone	..	58,814
	£5,295,213	£4,702,305
SUMMARY.		
	£	£
Ordinary Expenses	4,166,604	4,159,524
Extraordinary ,,	5,295,213	4,702,305
Total	£9,461,817	†£8,861,829

* This does not include New Construction. † Includes Supplementary Estimates.

Russian Navy Estimates, 1912.

Heads of Expenditure.	Proposed, 1912.	Voted, 1911.
	£	£
Administration	333,200	325,231
Pay, Victualling, Clothing, etc.	1,570,269	1,343,531
Cruising	2,538,631	2,249,419
Shipbuilding	7,616,850	4,609,444
Armaments	3,244,662	1,292,000
Naval Ports	1,644,537	1,223,575
Training	129,838	121,975
Martial Law	20,294	20,294
Compassionate Allowances, Rewards, etc.	54,294	54,294
Upkeep of Amour River Flotilla	148,750	123,781
Pensions	146,625	138,762
Total . . . . £	17,447,950*	11,502,306

* Not including Supplementary Estimate of £1,221.875 submitted in January, 1912, for new construction in the Black Sea.

Turkish Navy Estimates, 1911-12.

Converted at £1 = 111 piastres.

	1912.	1911.
SECTION I.		
CENTRAL ADMINISTRATION, *PERSONNEL.*	£	£
Minister of Marine, Under-Secretary of State, and Chief of Staff	2,973	2,973
Pay of Officers and Men	318,288	325,191
Civil Staff and Junior Officers	23,887	21,897
Foreign Officers	12,441	10,746
Naval Attachés	3,110	3,110
Officers to be sent to Europe, 50 in number	25,541	9,730
Officers in European Shipbuilding Yards	—	1,000
Staff of Naval School, Hade Hané Dockyard, and Naval Hospital	4,802	3,090
Victualling	246,198	262,346
Clothing	57,296	50,769
SECTION II.		
MATERIAL.		
Miscellaneous Expenditure	11,132	8,315
Sundry Stores and Wages of Workmen	86,383	91,257
Fuel and Oil	61,330	105,213
Customs	2,703	2,703
Lighthouses and Beacons	33,970	3,829
Port Dues	3,829	34,032
Timber	4,629	4,629
Repairs. New Buildings, &c.	41,655	41,655
Medical Stores	2,856	2,045
Electric and Other Machines	32,111	97,808
MISCELLANEOUS.		
Gunboats, Motor Launches, Wireless Telegraphy, Repairing Slip, etc.	137,907	371,187
Instalment on Cruiser to be built by Ansaldo	128,992	—
Torpedoes, Mines, etc.	66,466	—
Repair and Maintenance of Dockyard	158,788	—
Sundry Expenditure	13,235	
Total	1,510,522	1,453,525

NOTE.—The cost of the two battleships building in England is not included in the above Estimates.—ED.

United States Navy Estimates, 1912–13.

(Converted at £1 = $4·8665, being par, as adopted by Congress.)

Objects of Expenditure and Appropriation.	Estimates for year ending June 30, 1913.	Appropriated for year ending June 30, 1912.
	£	£
Pay of the Navy	7,488,759	7,206,212
Pay, Miscellaneous	205,486	205,486
Contingent, Navy	9,452	9,452
Naval Station (for Lepers), Island of Guam	2,876	2,876
Bureau of Navigation	675,051	699,530
„ Ordnance	2,788,349	2,456,489
„ Equipment	1,731,900	1,731,900
„ Yards and Docks	322,614	322,614
Public Works under Bureau of Yards and Docks; Public Works under Secretary of Navy (Naval Academy); Public Works under Bureau of Navigation (Training Stations and War College); Public Works, Bureau of Ordnance; ,, ,, ,, Equipment; ,, ,, ,, Medicine and Surgery; ,, ,, Marine Corps	1,010,952	1,527,069
Bureau of Medicine and Surgery	102,127	90,825
„ Supplies and Accounts	1,851,626	1,669,373
„ Construction and Repair	1,783,447	1,766,392
„ Steam Engineering	1,355,390	1,313,881
Naval Academy	124,713	128,577
Marine Corps	1,493,916	1,515,122
Increase of Navy:—		
Construction and Machinery	1,956,374	2,831,969
Torpedo-boats and Submarines	189,385	317,442
Colliers	119,453	—
Armour and Armament	2,675,392	2,164,372
Equipment	57,536	—
Total	£25,944,798	£25,989,581

THE DOMINION NAVIES.

THE DEFENCE SCHEME AS AGREED UPON BY THE REPRESENTATIVES OF GREAT BRITAIN AND THE OVERSEA DOMINIONS, AND ADOPTED BY THE IMPERIAL CONFERENCE, 1911.

I.—The naval Services and forces of the Dominions of Canada and Australia will be exclusively under the control of their respective Governments.

II.—The training and discipline of the naval forces of the Dominions will be generally uniform with the training and discipline of the Fleet of the United Kingdom, and by arrangement the officers and men of the said forces will be interchangeable with those under the control of the British Admiralty.

III.—The ships of each Dominion Naval force will hoist at the stern the white ensign as the symbol of the authority of the Crown, and at the Jack staff the distinctive flag of the Dominion.

IV.—The Canadian and Australian Governments will have their own naval stations as agreed upon from time to time. The limits of the stations are as described in Schedule A (Canada) and Schedule B (Australia).

V.—In the event of the Canadian or Australian Government desiring to send ships to a part of the British Empire outside their own respective stations they will notify the British Admiralty.

VI.—In the event of the Canadian or Australian Government desiring to send ships to a foreign port they will obtain the concurrence of the Imperial Government, in order that the necessary arrangements with the Foreign Office may be made, as in the case of ships of the British Fleet, in such time and manner as are usual between the British Admiralty and the Foreign Office.

VII.—While the ships of the Dominions are at a foreign port, a report of their proceedings will be forwarded by the officer in command to the Commander-in-Chief on the station, or to the British Admiralty.

VIII.—An officer in command of a Dominion ship, so long as he remains in a foreign port, will obey any instructions he may receive from the Government of the United Kingdom as to the conduct of any International matters that may arise, the Dominion Government being informed. A commanding officer of a Dominion ship having to put into a foreign port without previous arrangement on account

of stress of weather, damage, or any unforeseen emergency, will report his arrival and reason for calling to the Commander-in-Chief of the station or to the Admiralty, and will obey, so long as he remains in the foreign port, any instructions he may receive from the Government of the United Kingdom as to his relations with the authorities, the Dominion Government being informed.

IX.—When a ship of the British Admiralty meets a ship of the Dominion the senior officer will have the right of command in matters of ceremony, of international intercourse, or where united action is agreed upon, but will have no power to direct the movement of ships of the other Service unless the ships are ordered to co-operate by mutual agreement.

X.—In foreign ports the senior officer will take command, but not so as to interfere with orders that the junior officer may have received from his own Government.

XI.—When a Court-martial has to be ordered by a Dominion, and a sufficient number of officers are not available in the Dominion Service at the time, the British Admiralty, if requested, will make the necessary arrangements to enable a Court to be formed. Provision will be made by Order of His Majesty in Council and the Dominion Governments to define the conditions under which the officers of the different services are to sit on joint Courts-martial.

XII.—The British Admiralty undertakes to lend to the Dominions during the period of development of their services, under conditions to be agreed upon, such flag officer and other officers and men as may be needed. In their selection preference shall be given to officers and men coming from or connected with the Dominion, but they should all be volunteers to the Service.

XIII.—The service of officers of the British Fleet in the Dominion naval forces, or of officers of these forces in the British Fleet, will count in all respects for promotion, pay, retirement, etc., as service in their respective forces.

XIV.—In order to determine all questions of seniority that may arise, the names of all officers will be shown in the Navy List, and their seniority determined by the date of their commission, whichever is the earlier in the British, Canadian, or Australian Services.

XV.—It is desirable in the interest of efficiency and co-operation that arrangements should be made from time to time between the British Admiralty and the Dominions for ships of the Dominions to take part in fleet exercises, or for any other joint training considered necessary, under the senior naval officer. While so employed the

ships will be under the command of that officer, who would not, however, interfere in the internal economy of the ships of another Service further than may be absolutely necessary.

XVI.—In time of war, when the naval Service of a Dominion or any part thereof has been put at the disposal of the Imperial Government by the Dominion authorities, the ships will form an integral part of the British Fleet, and will remain under the control of the British Admiralty during the continuance of the war.

XVII.—The Dominions having applied to their naval forces the King's Regulations, Admiralty Instructions, and the Naval Discipline Act, the British Admiralty and the Dominion Governments will communicate to each other any changes which they propose to make in these Regulations or that Act.

SCHEDULE A (CANADA).

The Canadian Atlantic Station will include the waters north of 30 deg. North latitude, and west of meridian 40 deg. West longitude.

The Canadian Pacific Station will include the waters north of 30 deg. North latitude, and east of meridian 180 deg. longitude.

SCHEDULE B (AUSTRALIA).

The Australian Naval Station will include on the north from 95 deg. East longitude by parallel 13 deg. South latitude to 120 deg. East longitude, thence North to 11 deg. South latitude, thence to the boundary with Dutch New Guinea on the south coast in about longitude 141 deg. East, thence along the coast of British New Guinea to the boundary with German New Guinea in latitude 8 deg. South, thence east to 155 deg. East longitude.

On the east by the meridian of 155 deg. East longitude to 15 deg. South latitude, thence to 28 deg. South latitude on the meridian of 170 deg. longitude, thence south to 32 deg. South latitude, thence west of the meridian of 160 deg. East longitude, thence south.

On the south by the Antarctic Circle.

On the west by the meridian of 95 deg. East longitude.

THE COMMONWEALTH FLEET.

THE NAVAL BOARD.

[*Appendix to Report by Admiral Sir Reginald Henderson.*]

CONTROL AND ADMINISTRATION.

INTRODUCTORY REMARKS.

UNDER the Naval Forces Act of 1910, power is taken to constitute a Naval Board with such functions "as may be prescribed." Under the Regulations and Standing Orders for the Naval Forces of the Commonwealth at present in force, "the Naval Board shall, subject to the control of the Minister, be charged with the administration of all matters relating to the Naval Forces," and "the Members of the Board shall severally exercise such powers and perform such duties as are from time to time assigned to them by the Minister." The Board does not, however, appear to have any executive authority or control over the Naval Forces. The Regulations as to the government of the Forces are: "The Director and every member of the Naval Forces permanently employed shall faithfully and diligently employ the whole of their time in the service of the Commonwealth, and shall in all things obey the orders and directions of the Government." "All orders and directions of the Government with respect to the administration of the Forces shall be communicated by the Board, and Commandants will issue the necessary orders to give effect to them." The control of the Naval Forces, under present conditions, is, therefore, exercised by the Government, *i.e.*, the Minister of Defence, through the Naval Board, but the Naval Board has no powers of its own, and is merely a mouthpiece.

In considering the question of the control of a service such as the Navy, there are two points to be met—(*a*) The system must admit of complete Parliamentary control and responsibility; but as far as possible such control should in practice be restricted to matters of policy and finance, and the power of Parliament to interfere in matters of detail in the government and administration of the Navy should be reserved for very exceptional circumstances. (*b*) The controlling authority should be such as will have the full confidence of the officers and men of the Service, whose careers are entrusted to it, and should contain Naval Officers whose sole interest

would be to maintain the Navy in an efficient state by providing for all its needs. The enormous value to the Naval Service of obtaining and retaining the confidence and loyal support of the *personnel* to its governing body cannot be too much emphasised. In the Mother Country these two requirements are met by the appointment of a Board of Admiralty, on which there are two political members and four senior naval officers of reputation: this Board is responsible as a whole for the government of the Navy, and is appointed, and acts, as a single authority.

I recognise that there is great difference between the conditions as regards the Naval Forces in the Mother Country and the Commonwealth. In the former both the Navy and the Board of Admiralty have been established for a long period, and have stood the test of time and experience; in the latter both the Navy and its controlling authority have to be created, and must necessarily be experimental. Nevertheless, I consider that a Board constituted on the lines of the Board of Admiralty, and having responsibility as a whole, would meet the requirements of the Commonwealth better, and would be well qualified to foster and develop the Australian Fleet. It is essential, too, that the controlling authority in Australia should have and retain the full and complete confidence of the Admiralty.

Ministers are here to-day and gone to-morrow; their responsibility ends with their tenure of office, whereas the Navy is a living and growing organism, the creation of years, for which continuity of policy is essential. It should not be within the power of the Government of the day, for financial or any other reasons, to take steps which may have disastrous effect at a future date on the safety of the Commonwealth, unless such steps are carried out with the full knowledge and approval of the people of Australia, who would have to bear the consequences. A Board on which senior officers of the Navy sit is not likely to suffer any such steps to be taken without protest.

In further development of this proposal, I consider that the annual Estimates of Expenditure as framed by the Board should be signed by each Member of the Board, and be subject to alteration by Parliament alone. I have dealt rather fully with this matter, as I view it as being of paramount importance to the well-being of the Commonwealth naval development, and I cannot too strongly express my hope that the Navy will be kept outside party politics. "It must be distinctly recognised that a National Force, maintained at a high standard of efficiency, can only be produced by the work of years, and that such work must be steady and continuous; any divergence from the policy decided on may, and probably will, lead

to chaos and useless expenditure of money." (Lord Kitchener in his Memorandum on the Defence of Australia.)

THE CONSTITUTION OF THE NAVAL BOARD.

The Board recommended is as follows:—

1. The Minister of State for Defence (or for the Navy, should a separate Naval Department be created later).

2. First Naval Member (to be a Senior Officer of the Commonwealth Navy, not below the rank of Captain).

3. Second Naval Member (to be a Senior Officer of the Imperial Navy, not below the rank of Captain).

4. Third Naval Member (to be a Senior Officer of the Commonwealth or Imperial Navy, not below the rank of Captain).

5. Finance and Civil Member (to be a Member of Parliament, of the Senate when the Minister is in the House of Representatives, and *vice versa*, or as an alternative this Member might be a Senior Naval Accountant Officer or a Civilian Accountant).

With a Permanent Secretary of the Board, I also recommend that this Board should have a Naval Representative (at the outset a Captain in the Imperial Navy should be selected) in London, to be attached to the staff of the High Commissioner, to be accommodated with an office in the Admiralty Building, and to be allowed personal access to the Members of the Admiralty Board and to the various Admiralty Departments; this officer to be the channel of communication between the Commonwealth Naval Board (whom he would represent, and from whom he would receive instructions) and the Home Board of Admiralty. This officer would, in fact, represent the Commonwealth Naval Board in the same way that the High Commissioner represents the Commonwealth Government, and he would be under the orders of, and receive the support when necessary of, the High Commissioner. He could be most useful in maintaining uniformity between the two Boards, and in ensuring harmonious action when both Boards had to act in concert, and in watching generally over the naval interests of Australia. This position should be held later by an officer of the Commonwealth Navy. The selection of an Imperial Officer for 2nd Naval Member is recommended because the Commonwealth Fleet is, and must continue for a very considerable time to be, dependent to a great extent on the *personnel* of the Imperial Navy, and it is desirable that such officers and men should know that they are represented by one of their own officers on the Board under which they will be serving.

Allocation of Duties.

The Naval Board should act as a whole, its orders being issued under the signature of its Secretary, but for matters of routine it would be convenient to allocate to each Member certain special spheres of supervision, *e.g.* :—

1. The Minister.—President of the Board and general supervision; represent Department in Parliament; to be referred to by the Member of the Board concerned on all questions of policy and important matters; to represent to the Governor in Council all senior appointments, commands, etc.

2. First Naval Member.—War preparations, Naval Intelligence, Naval Ordnance, Fleet Exercises, Manœuvres, Gunnery and Torpedo Exercises, etc., Naval Works, advise as to senior appointments.

3. Second Naval Member.—*Personnel* and Reserves, Discipline, Stores, Victualling, Medical.

4. Third Naval Member.—Construction and engineering of ships, repairs, control of Naval Dockyards and Bases.

5. Finance and Civil Member.—Finance, contracts, legal questions.

Permanent Secretary (does not vote as a member of the Board).—Charge of the clerical staff, and responsible for the clerical duties of the Department, responsible for safe custody of confidential books and documents; signs Board Orders "by order of the Naval Board."

In the case of the Board of Admiralty, under the Admiralty Act, 1832, "any two Commissioners may exercise and execute" all the legal powers of the Admiralty (*e.g.*, issue of court-martial warrants, disciplinary orders, etc.), and it would probably be convenient to obtain such legal powers for any two Members of the Naval Board.

Departmental Staff.

Under the Naval Board there would be various administrative departments, who would be responsible to the Board as a whole, but for general work would, as a rule, deal with the particular Member concerned with the work of the Department. The following departmental heads would be required :—Accountant-General—(Examination of accounts, preparation of Estimates, etc.). Director of Naval Construction and Dockyards—(Preparation of plans of ships, supervision of their construction, deal with repairs and alterations to vessels, advise on dockyard requirements, and administration). Director of Works—(Preparation of plans for docks, buildings generally, supervision of their construction, repairs, and alterations, etc.). Director of Stores, Victualling, and of Naval Contracts—

(Purchase and supply of Naval and Victualling Stores). Director of Naval Ordnance—(Gunnery and Torpedo matters, including purchase and supply of *matériel*).

The naval and clerical staff that would be required to assist the above may be taken approximately:—One Commander as Private Secretary to Minister. One Commander as Assistant to 1st Naval Member and as President of Intelligence Committee. One Clerk as Private Secretary to 1st Naval Member. One Clerk as Private Secretary to 2nd Naval Member. One Clerk as Private Secretary to 3rd Naval Member. One Clerk as Private Secretary to Finance Member. Twenty Clerks for Secretary's and other Departments.

I would add that I consider it essential to the efficiency of the Department that the control of its staff should rest in the Department, and that the Commonwealth Public Service Commissioner should have no authority over any of them such as he now possesses. Similarly, I consider that the system under which certain expenditure on naval buildings is controlled by the Department of Home Affairs is unsound; all such work should be under the Naval Department.

I have not touched upon the legal difficulties that may arise as regards the control of the Commonwealth ships and their crews when outside Australian waters, as I understand that this matter will be discussed in England during 1911.

NUMBERS OF *PERSONNEL* OF PRINCIPAL NAVIES.

YEAR.	GREAT BRITAIN.	GERMANY.	FRANCE.	RUSSIA.	ITALY.	AUSTRIA-HUNGARY.	UNITED STATES.	JAPAN.
1901	117,116	31,157	53,324	61,503	26,750	9,069	33,351	—
1902	121,870	33,512	53,247	62,709	26,948	9,391	37,126	30,412
1903	125,948	35,834	52,966	64,393	26,994	10,277	41,805	32,810
1904	130,490	38,128	52,559	69,856	26,994	10,469	45,398	33,541
1905	127,667	40,843	54,549	71,527	27,492	11,989	50,049	—
1906	127,431	43,654	57,108	59,822	28,000	13,099	50,295	39,682
1907	127,228	46,936	57,461	55,343	28,476	13,133	51,942	41,777
1908	127,909	50,531	57,035	44,949	29,571	14,053	54,867	46,443
1909	127,968	53,946	57,351	46,845	30,613	14,954	58,827	47,240
1910	131,000	57,373	58,595	46,885	30,613	16,148	61,890	44,311
1911	134,000	60,805	58,649	46,655	30,587	17,277	62,283	49,389

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B.

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